THE

RAILWAY GAZETTE

Price: Two Shillings | FRIDAY, DECEMBER 15, 1961 | Annually £5 by post

This truck can reach to a height of 10ft. carrying a maximum load of 2,500lb. in aisles only 6ft. wide. It is made by Lansing Bagnall, the largest and most experienced manufacturers of materials handling machinery in Europe; machinery that can cut the cost, and time, of any handling operation—in all manufacturing, distributive and extractive industries.

Brilliant Features Lansing Bagnall's FRES 2 reach truck, with its extension/retraction design, allows it to stack at right-angles in aisles only 6ft. wide. With the masts retracted the load is carried between the wheelbase—giving excellent stability, and safety for the load and operator at all times.

Low Operating Cost The FRES 2 works a full shift on one battery recharge, at a cost of 1/6d. Batteries are recharged simply by plugging into the nearest power point of standard AC mains supply. For continuous shift-working, batteries can be changed over by one man in a few minutes.

IN 6FT AISLES THIS TRUCK CAN LIFT 2500 lb 10 FT!

Simple Operation All controls are within finger-tip reach. One-hand steering leaves the other hand free for control of speed or lifting, lowering and reaching operations, and permits rapid manoeuvring with maximum comfort and safety for the operator at all times.

Instant Accessibility The drive and charge units are completely exposed for maintenance by opening a heavy-plate rear door. The battery is also readily accessible for inspection, and topping-up can be completed in a few seconds.

After-Sales Service Lansing Bagnall offer the most efficient and comprehensive after-sales service in the industry—14 regional depots throughout the country with over 40 service vans on call 24 hours every day for the whole life of every truck.

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S. G. IRON (also called Nodular or Ductile Iron) to B.S. 2789 (1961) SNG. 37/2 (formerly Type 1) and SNG. 27/12 (formerly Type 2A).

DARCAST S. G. Iron castings to these specifications are made in large quantity production, and offer the following features:

Soundness and accuracy
Good machinability
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Reduced machining allowances

DARCAST service is second to none and we can draw on our wide experience to assist at all stages from development of prototypes to the final design.
Examples of the types of castings are Axle Boxes, Covers, and other railway equipment castings.

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DARTMOUTH AUTO CASTINGS LTD.
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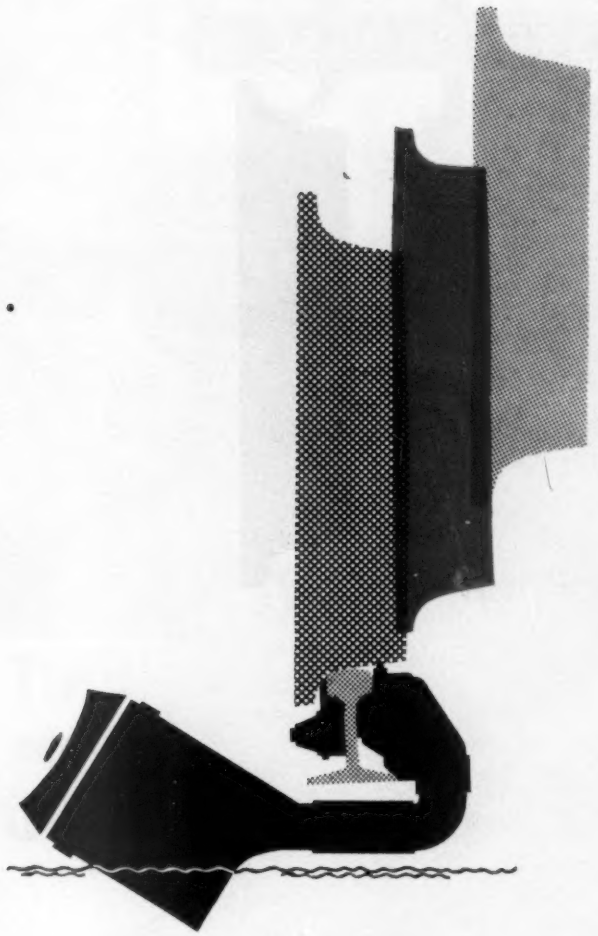
P&M

Track
Appliances . . .



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P. & M. Lubricators increase the life of curve rails and wheel flanges at least 5 times, and reduce curve resistance.

Essential on lines operated by electric or diesel traction.

P. & M. Lubricators are supplied to suit all types of track—for running rail or check rail lubrication.

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CTC

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UNIT CONSTRUCTION
is one of the
MODERN FEATURES

By courtesy of Rhodesia Railways

BRITISH DESIGN AND MANUFACTURE

The unit construction of the modern Westinghouse centralised traffic control machine permits the addition of further unit sections which can be inserted at any point in the machine, connections being made to terminal blocks in each unit. The storage units in each section are plug-connected for easy removal for maintenance.

The machine illustrated above was built and installed by WESTINGHOUSE for RHODESIA RAILWAYS and will eventually control main-line train movements between Gatooma and Headlands, a distance of 184 miles. A similar machine has controlled traffic on the 85-mile section between Mpopoma and Gwaai since 1958.

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Saxby & Farmer (India) Private Ltd., Calcutta
McKenzie & Holland (Australia) Pty., Ltd., Melbourne
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Agents—Bellamy & Lambie, Johannesburg

LIGHTWEIGHT
Coaches for
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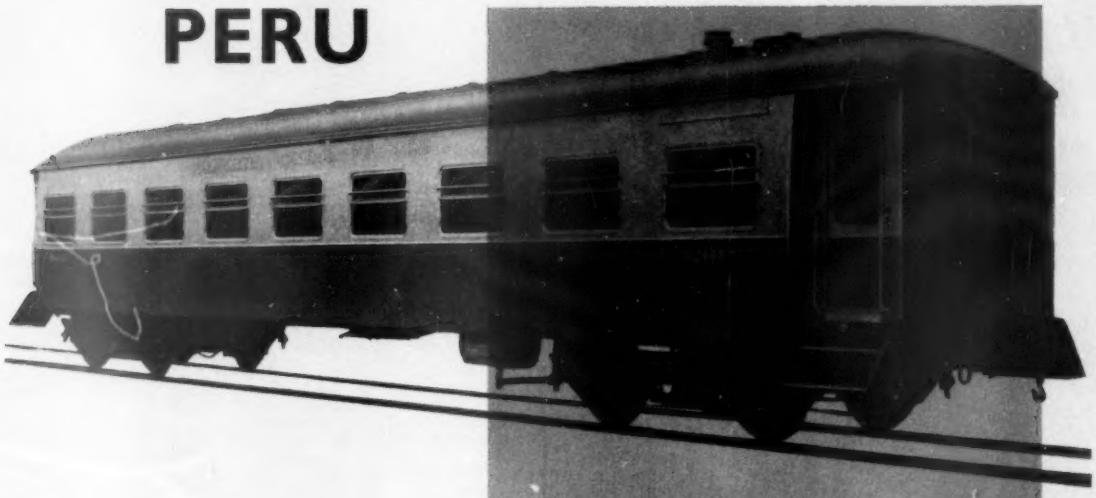
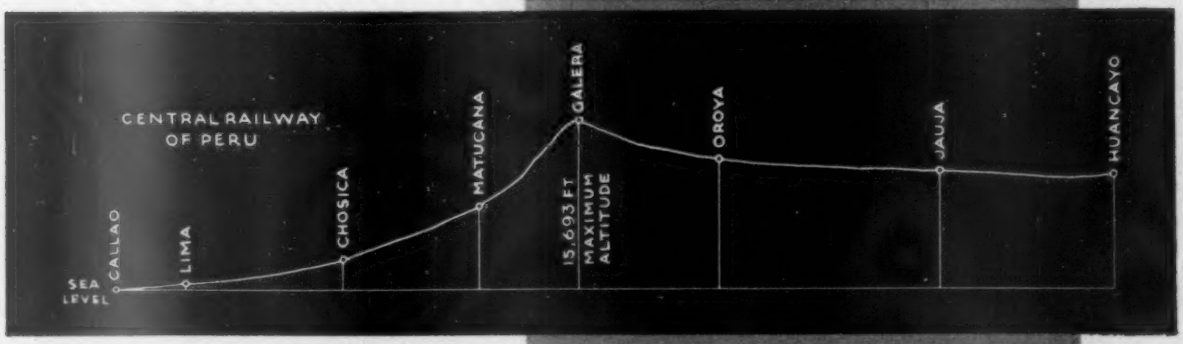


Recently delivered for service on the Central and Southern Railways of Peru are a number of special lightweight steel coaches of various types with tare weights of 18½ tons. Illustrated is a 1st class kitchen buffet car with seating accommodation for 26 passengers.



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Bristol Siddeley Maybach diesels power the new Hymek locomotives

Bristol Siddeley Maybach* diesel engines have been chosen for the new Hymek diesel-hydraulic locomotives. 95 of these Type 3 locomotives have been ordered for main-line use on British Railways Western Region. This now brings the total order placed with Bristol Siddeley for British Railways to 286.

DESIGNED FOR ECONOMIC OPERATION

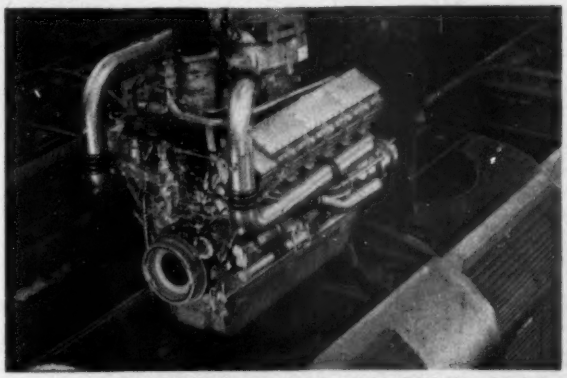
Bristol Siddeley Maybach rail traction diesel engines range from 384 to 2,000 hp and embody design features which produce more efficient operation in terms of lower wear, greater reliability and easier servicing.

The immensely strong, roller bearing disc-webbed crankshaft, for example, is extremely rigid in its tunnel housing.

Disc-webbed, roller bearing crankshaft and tunnel housing

This results in very low main and big-end bearing wear. The pressure-oil cooling of the pistons gives effective heat dissipation which reduces liner and gas ring wear to a minimum.

Since the majority of components are identical in all models, spares stocks can be cut and servicing is simplified through interchangeability.



Maybach diesel engine being installed in D800 Class at Swindon.

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Maybach engines are in service all over the world, and have built for themselves an unsurpassed reputation as the most efficient diesel engines of today. This reputation, backed by the efficient Bristol Siddeley after-sales and spares service, offers the most satisfactory solution to all rail traction requirements.

For further information, please write to: Power Sales Manager, Power Division, Bristol Siddeley Engines Limited, PO Box 17, Coventry, England. Cables: Brisidair, Coventry.

**Manufactured in the UK under exclusive licence from Maybach-Motorenbau GmbH.*

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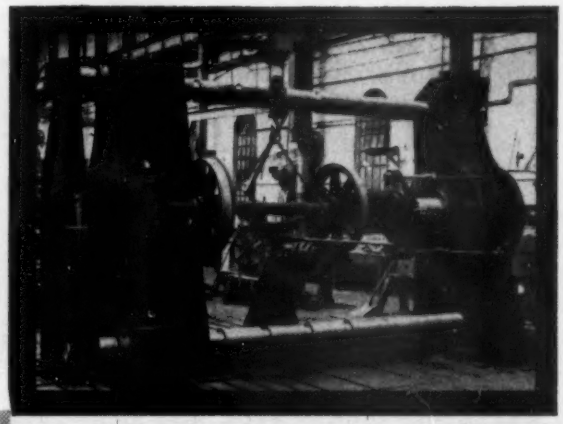

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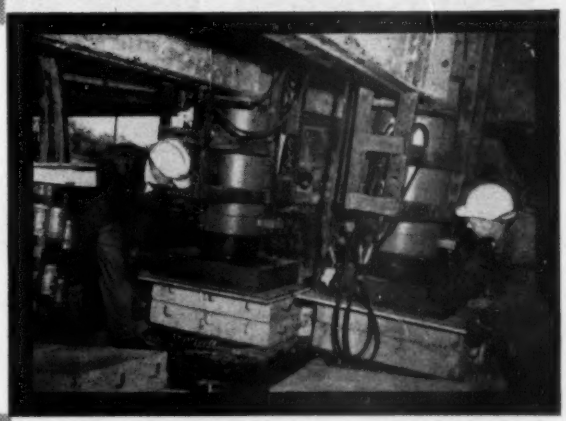

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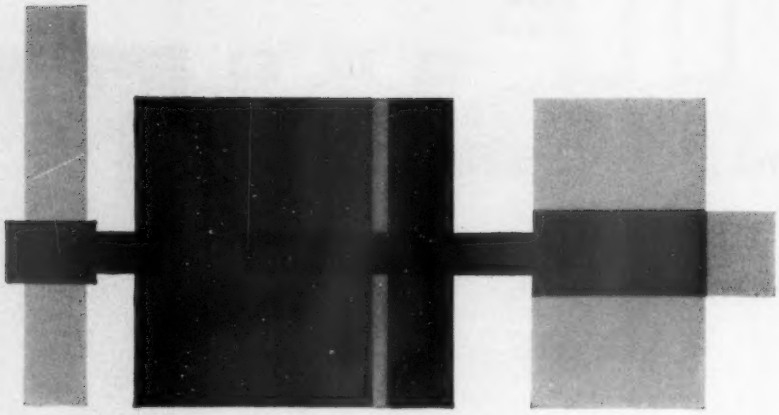
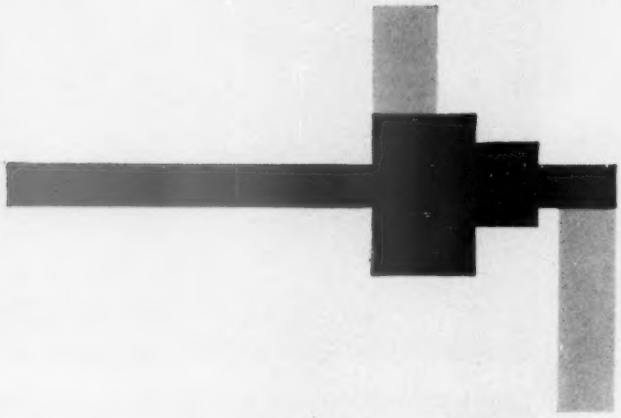
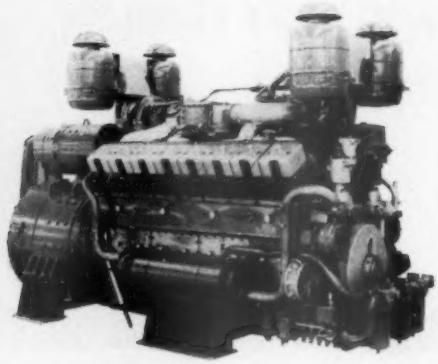


Werkspoor RUB engines





transmission end completely accessible: wide range of applications

All essential auxiliary machinery is direct-driven from the front end of the engine and is therefore easily accessible. The coupling end has been left completely free so that the unit to be driven can be directly connected to the engine. Werkspoor RUB engines have a wide range of applications.

Werkspoor RUB engines are four-stroke, high-speed V-engines available with capacities ranging from 320 to 3,000 h.p. at 900 - 1,500 r.p.m. Bores 160 and 215 mm.

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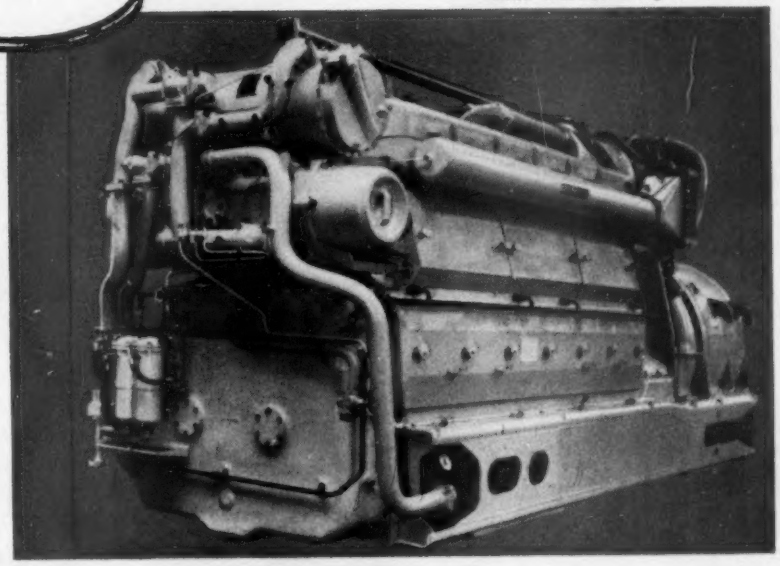
Baudoin

Duralumin pistons make engines light hearted

Sulzer 12LDA28—B engine—2,500 h.p.



Vickers-Armstrongs (Engineers) Ltd are using Duralumin 'J' to make the pistons for the Sulzer engines which are being incorporated in the new diesels on British Railways. Vickers chose 'Duralumin' because it combines high strength with light weight. These pistons are being produced in the James Booth Forging Department which houses the 12,000-ton forging press capable of producing large forgings up to a weight of 3 tons.

Consider the use of light alloy forgings in your business—you will find the James Booth service refreshingly helpful.

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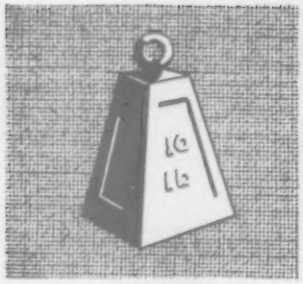

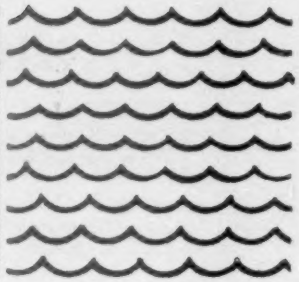

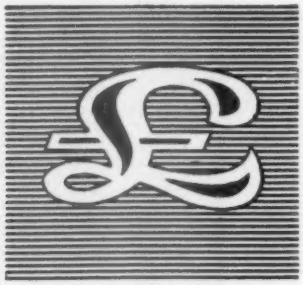

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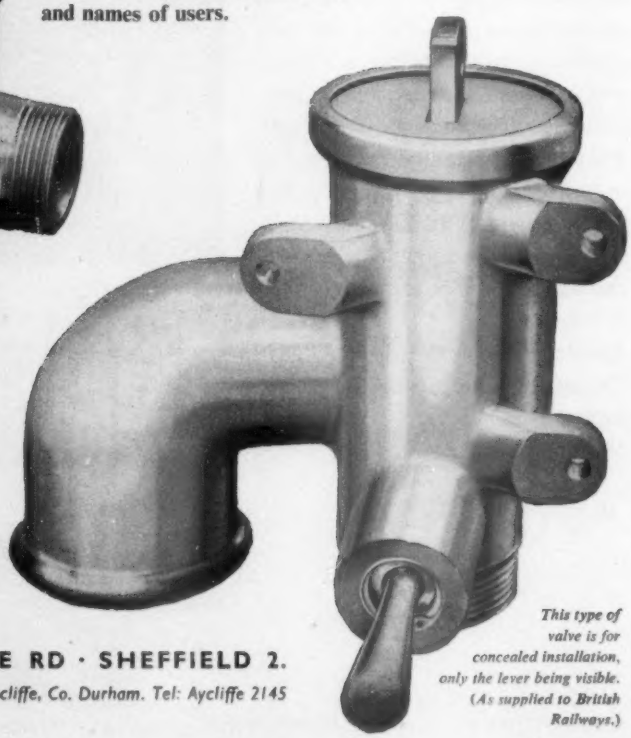
The trouble-free operation of these valves is determined by basically simple design, ensuring positive re-seating and instantaneous action. This same simplicity eliminates the need for small bye-passes so there is no risk of clogging.

Available with trip lever or push button control as illustrated.

Write for explanatory literature and names of users.

Mushroom relief valve with push button control.

Mushroom relief valve with trip lever control.



This type of valve is for concealed installation, only the lever being visible. (As supplied to British Railways.)

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Enquiries should be sent to the local AEI Office or direct to AEI Traction Division, Trafford Park, Manchester 17.

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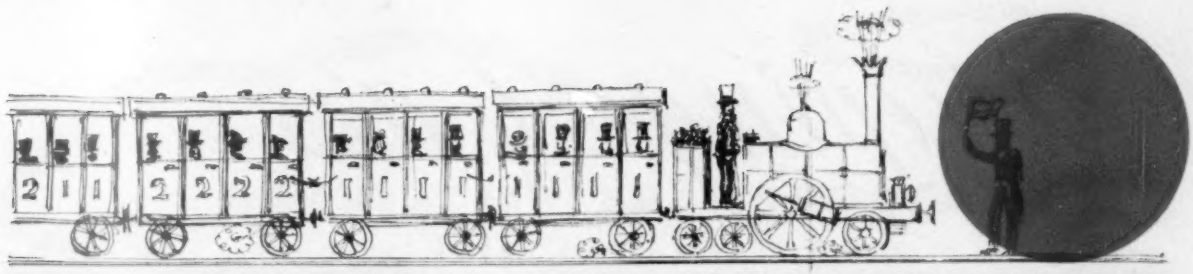

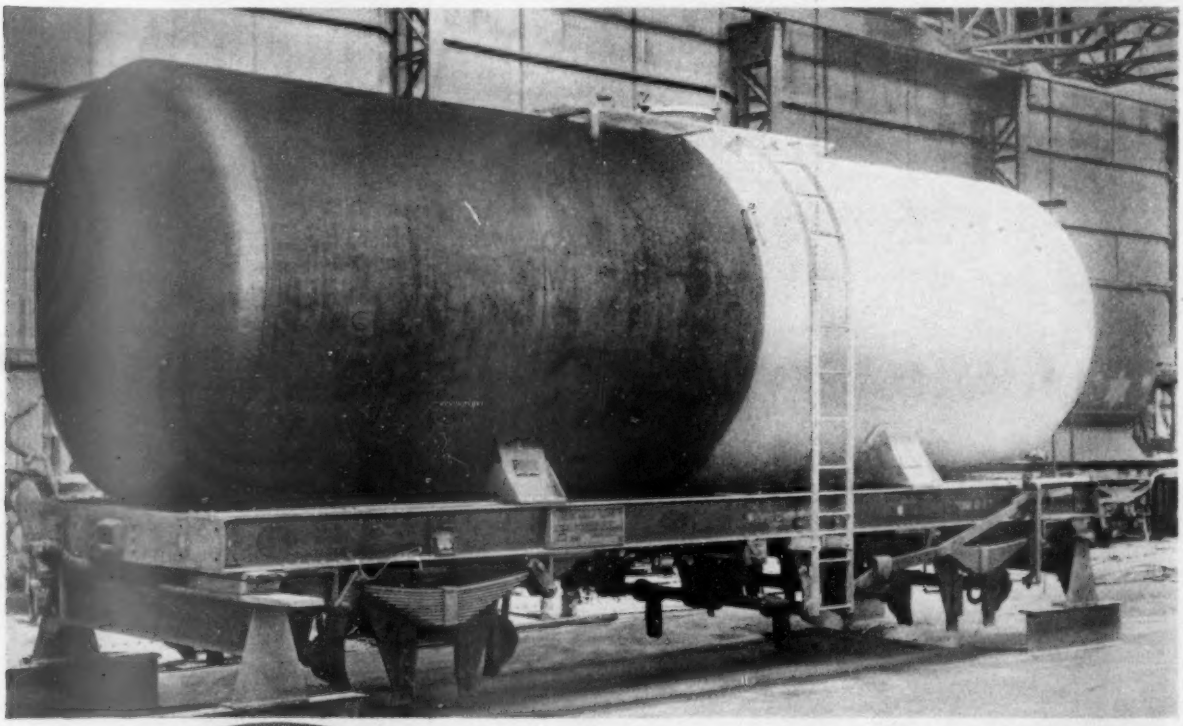

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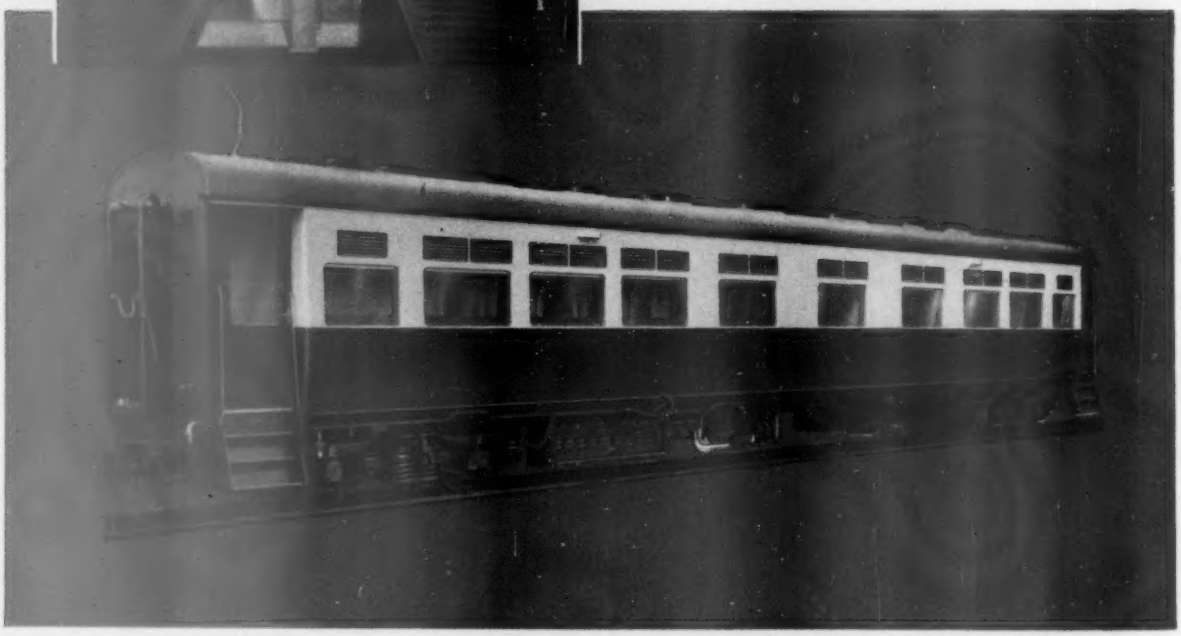

One of the second class sleeping cars recently completed for East African Railways and Harbours. Each car accommodates 33 passengers in 6-berth and 3-berth compartments.

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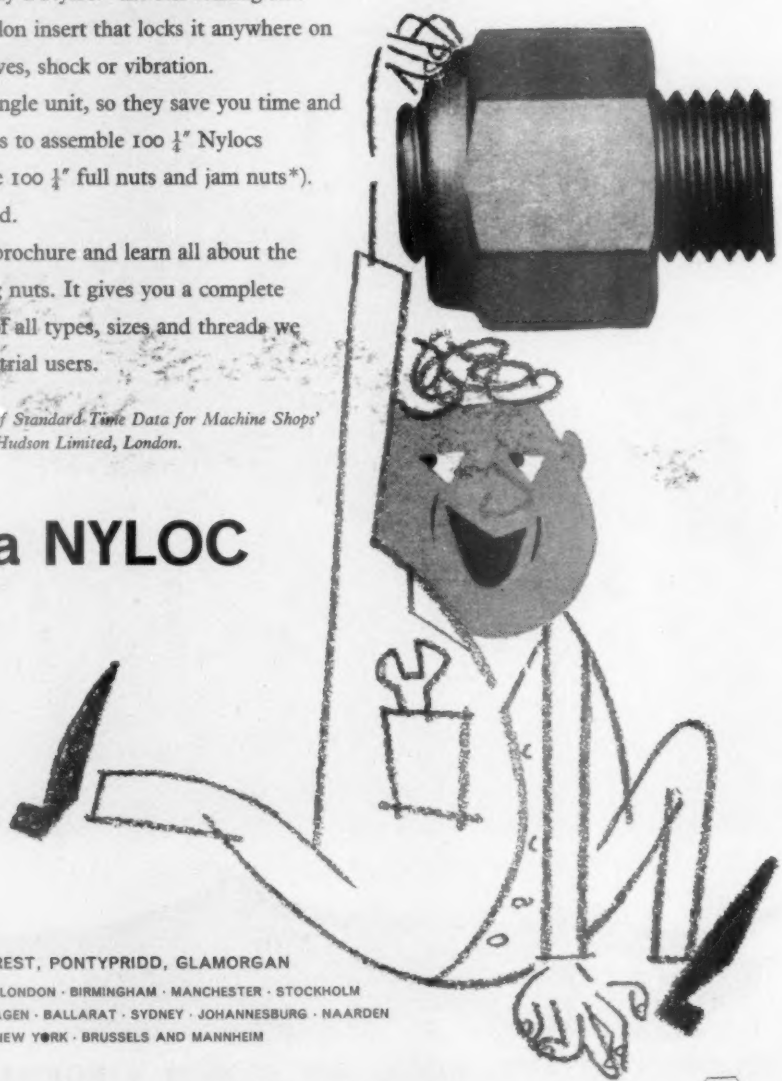
* *These times are based on 'The Handbook of Standard Time Data for Machine Shops' by Haddon & Genger, published by Thames & Hudson Limited, London.*



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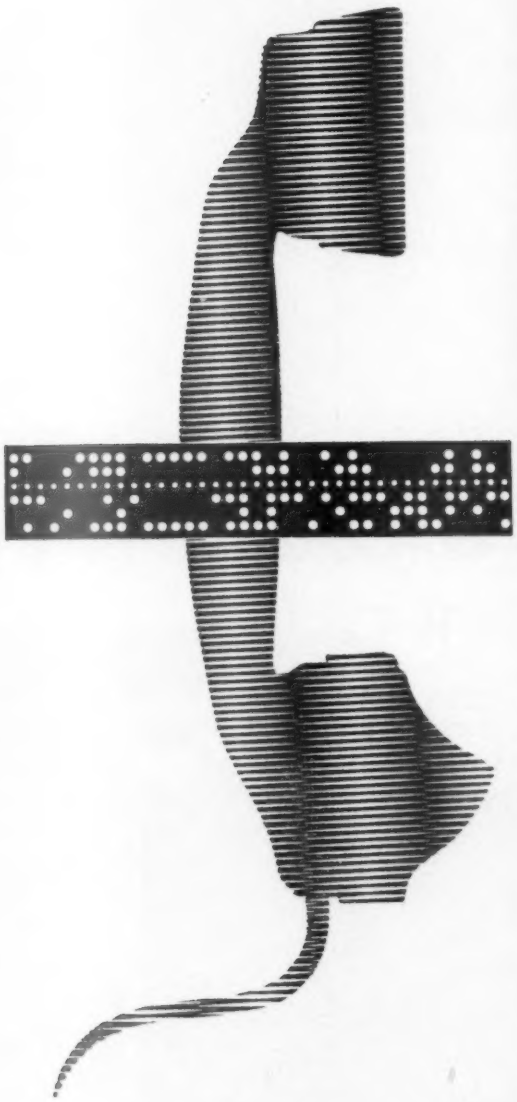

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300 Channels between Newcastle and York

British Railways first microwave multichannel system from Newcastle to York via Darlington will have a 300 telephone channel capacity. The system allows for channels to be dropped off at intermediate points and can accommodate high speed data transmission.

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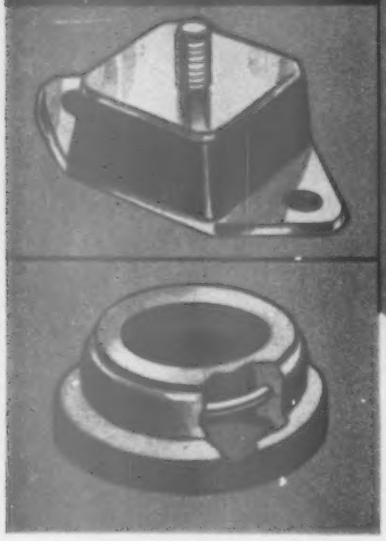

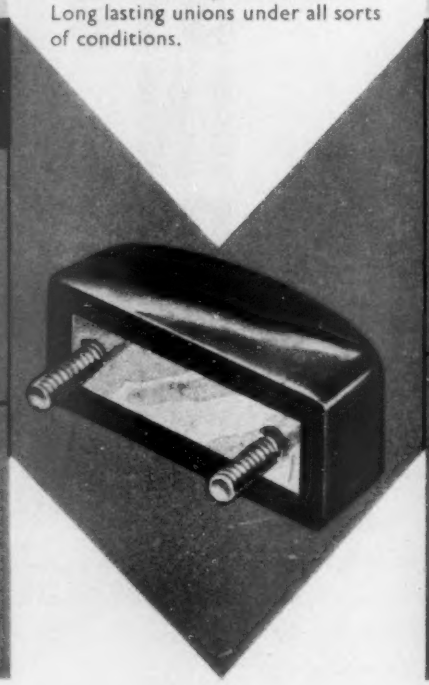

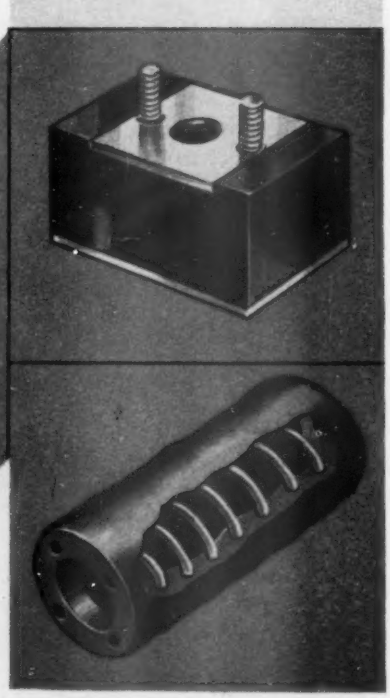

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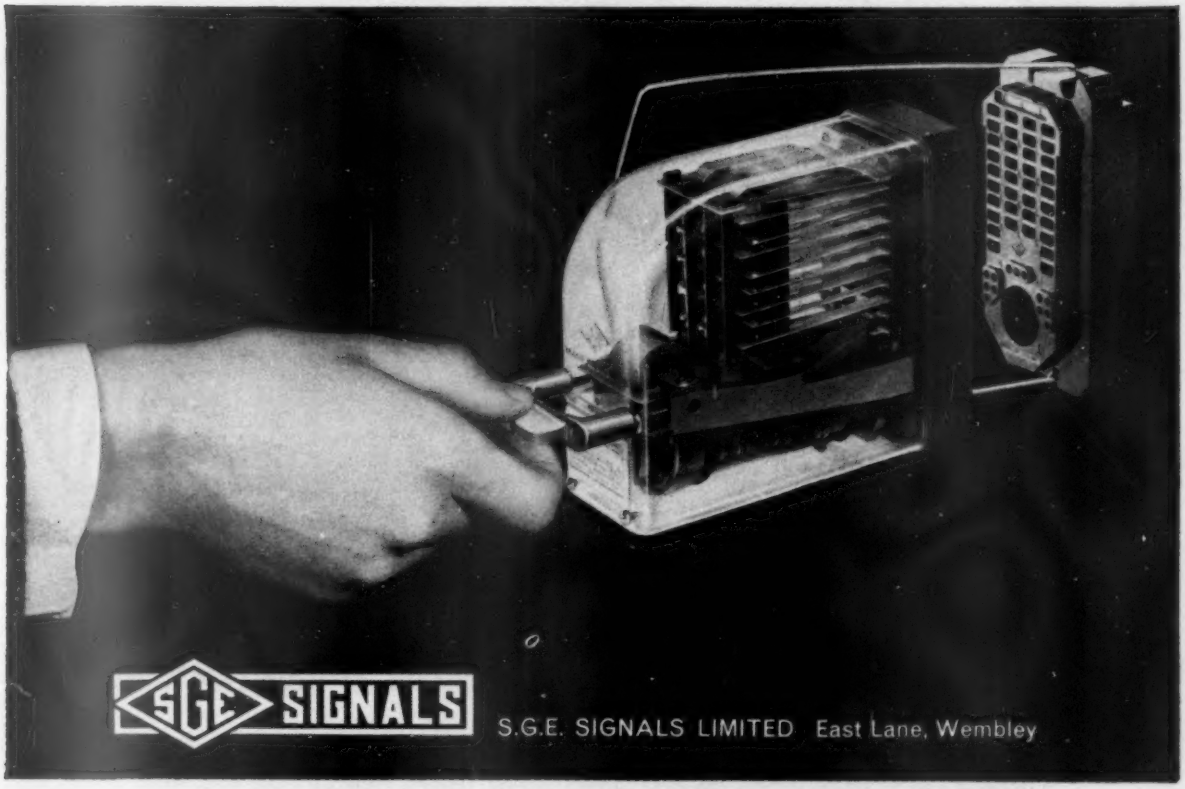

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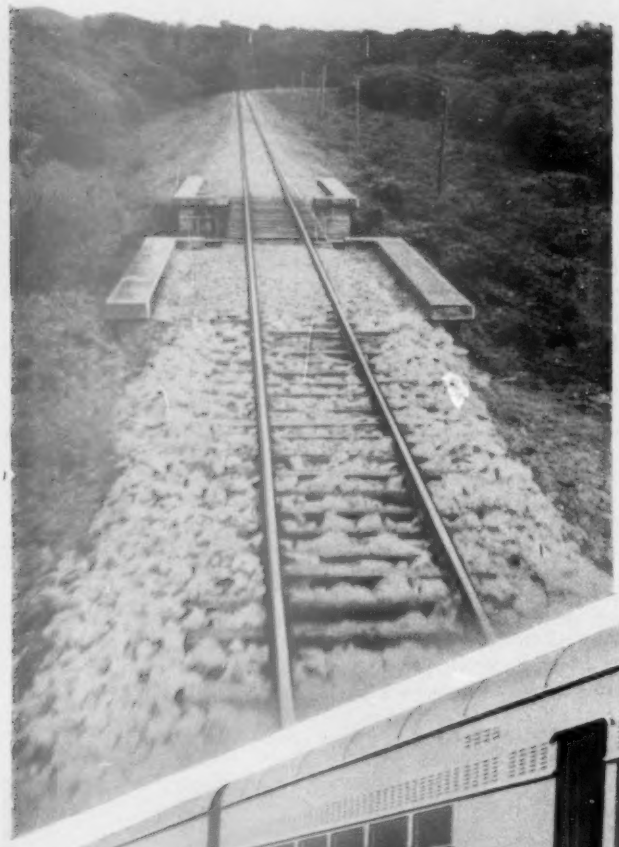
Economy along these lines



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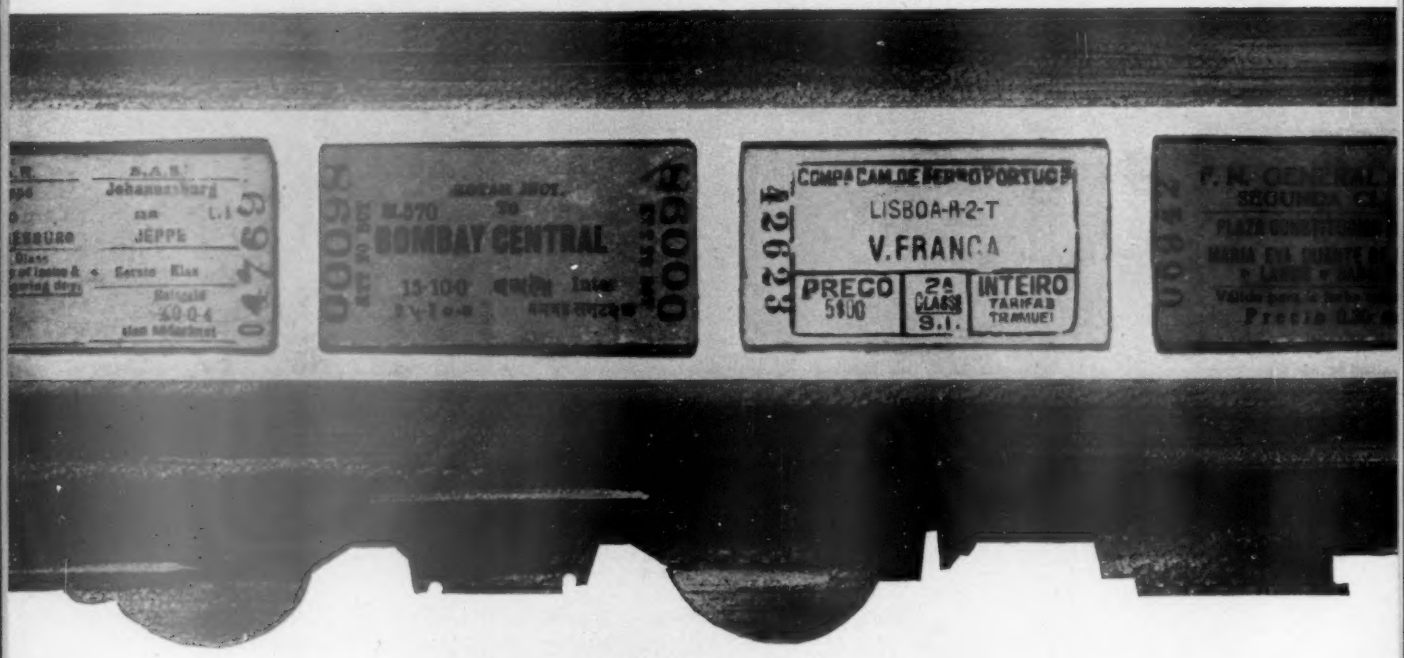

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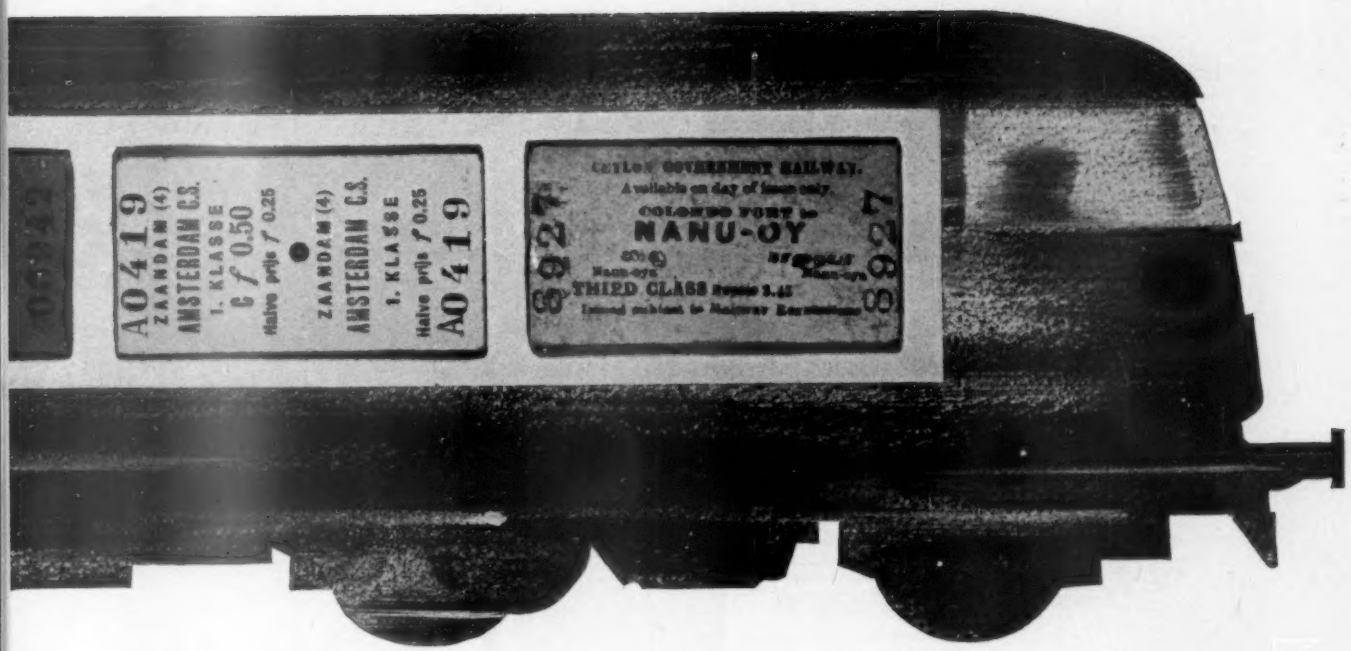

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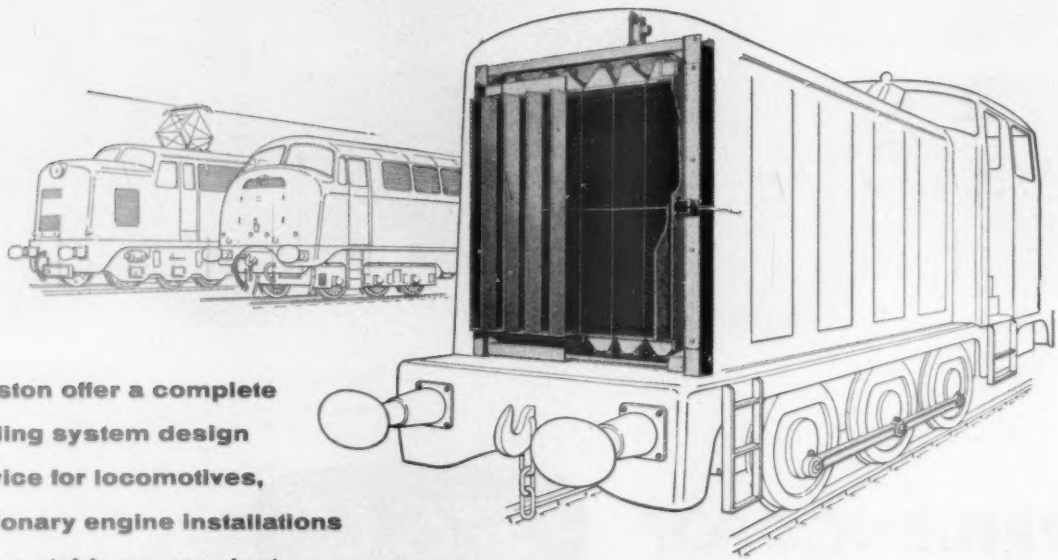

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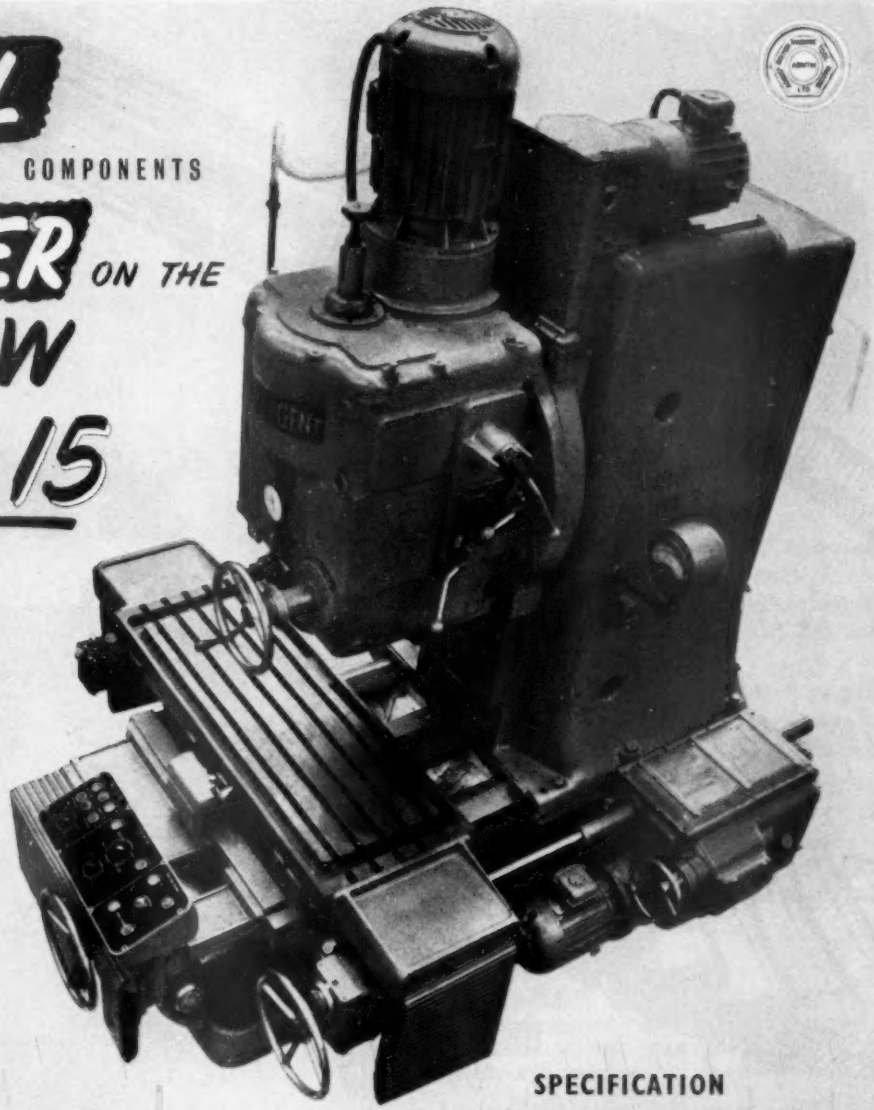

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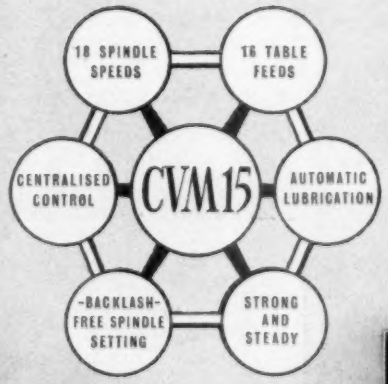

SPECIFICATION

WORKING SURFACE OF TABLE	54 in. x 16 in.
HEIGHT ADMITTED BETWEEN SPINDLE NOSE & TABLE	MIN. 1½ in. MAX. 24 in.
DISTANCE FROM CENTRE OF SPINDLE TO FACE OF COLUMN	18 in.
SPINDLE ADJUSTMENT	6 in.
SPINDLE DRIVING MOTOR	10 h.p.
SPINDLE SPEEDS: up to 1600 r.p.m.	
THREE OPTIONAL RANGES OF 18 SPEEDS	
RANGE 1.	20 TO 1000 r.p.m.
RANGE 2.	25 TO 1250 r.p.m.
RANGE 3.	32 TO 1600 r.p.m.
TABLE FEEDS: up to	63 ins./min.
FOUR OPTIONAL RANGES OF 16 FEEDS	
RANGE 1.	0·8 TO 25 ins./min.
RANGE 2.	1·18 TO 37·5 ins./min.
RANGE 3.	1·6 TO 50 ins./min.
RANGE 4.	2 TO 63 ins./min.
TABLE RAPID TRAVERSE	100 ins./min.

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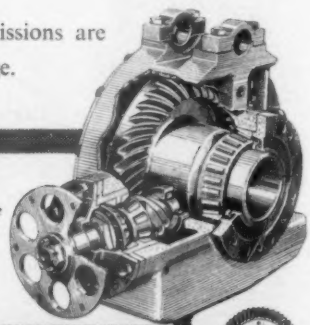

A typical ENV hypoid axle drive, as supplied to Schindler Wagons A.G.

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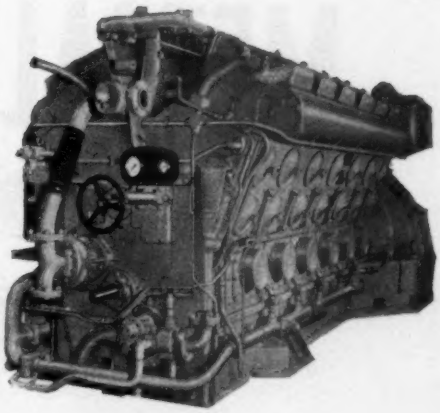
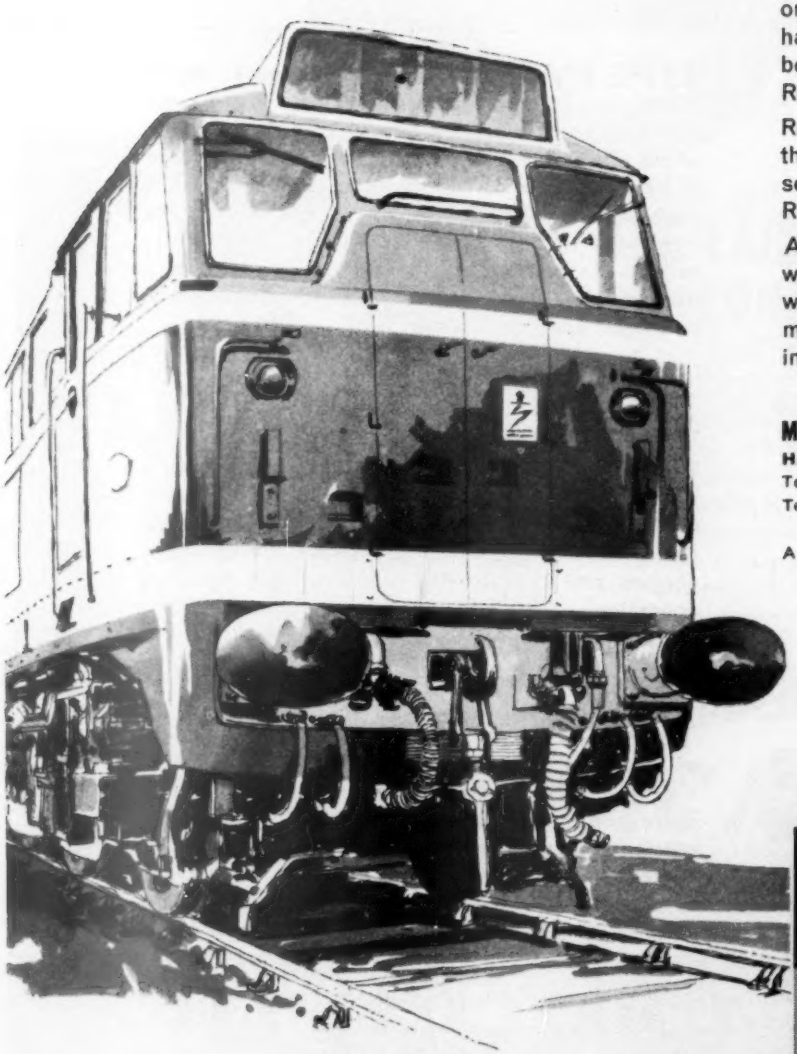


A 1365 h.p. power unit showing the Control End of the Mirrlees JVST 12 Rail Traction Engine.

The work-horse of the Eastern Region



Whether on fast passenger workings or hauling freight the Mirrlees diesel has earned the enviable reputation of being the work-horse of the Eastern Region.

Repeat orders are still coming in and there are now over 200 locomotives in service on this section of British Railways.

Although 'reliability' is an overworked word it is, nevertheless, one reason why Mirrlees diesel engined locomotives are appearing more and more in the traffic diagrams.

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TYPE FV.4 A standard Driver's Automatic Air Brake Control Valve with automatically controlled high pressure brake releasing impulse. This Valve enables the maximum speed of brake release to be obtained, and in addition enables the full utilisation of all the advantages associated with modern air brakes. The Valve is reliable in service and simple to operate and maintain and is especially suitable for long express passenger and goods trains. Leaflet A.4.

TYPE FD.1 This is a simple Brake Control Valve suitable for direct braking or shunting brake requirements. It is very simple to use and accurate in operation. The type FD.1 Valve can also be adapted for the control of the Diesel engines and can also be made suitable for cam operation. Leaflet A.13.

TYPE LST.1 A locomotive Triple Valve of modern and simple design. The LST.1 Operating Valve embodies a control for freight or passenger train operation, together with a high efficiency Brake relay, also an Anti-skid Brake device may be provided when required. This Valve is capable of controlling the air supply to several Brake Cylinders when required. Leaflet A.2.

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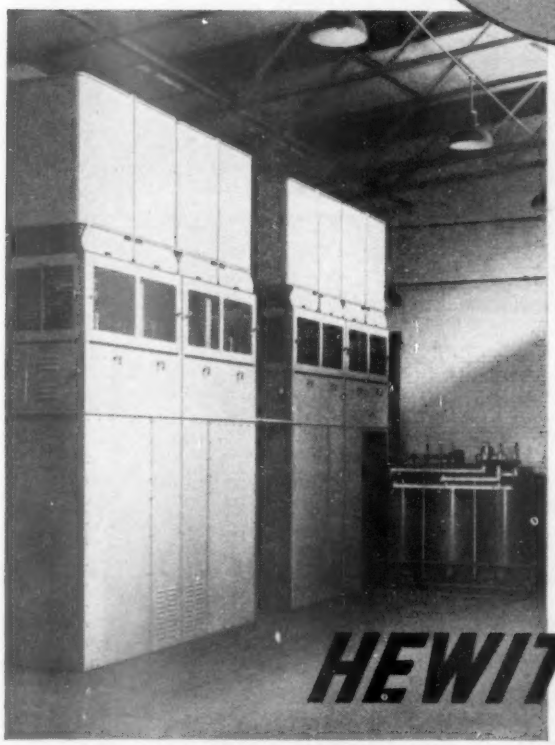

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The photograph, left, shows two 1,500 kW equipments. One of the two main transformers in the farther set is withdrawn to show its location.

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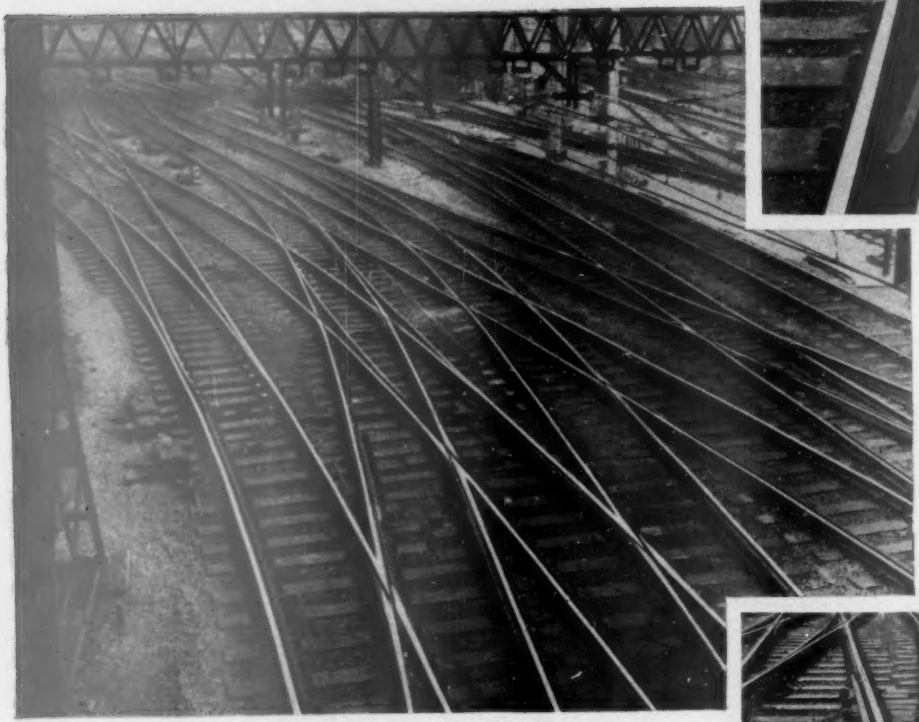
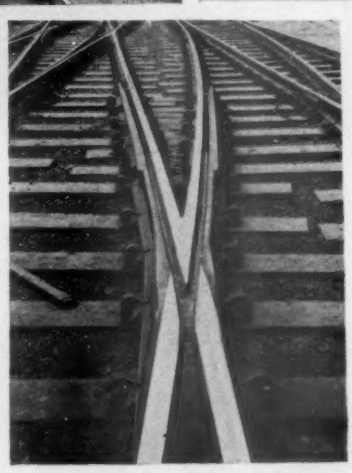
EDGAR ALLEN TRACKWORK at terminal stations in electrified areas



Cast manganese steel crossings at Liverpool Street Station.
Photographs by courtesy of British Railways, Eastern Region.

Obtuse cast manganese crossing

Common cast manganese crossing



With the introduction, by British Railways, of diesel and electric trains, greater wear takes place on the switches, crossings and closure rails. Manganese steel has been used at many of the leading terminal stations and has been found to stand up to the wear better than other steels. At Liverpool Street Station over 120 cast manganese steel crossings have been put in, together with rolled manganese steel switches and closure rails, in the running lines on both eastern and western sides of the station.

Edgar Allen & Co. Limited have also installed layouts in manganese steel in other terminal stations in London and Glasgow.

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An international journal of management, engineering and operation

VOL 115 FRIDAY DECEMBER 15 1961 No. 24

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Editor: B. W. C. Cooke, Assoc. Inst. T.

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A disservice to railways

THE abortive action last week of a small group of motormen at Gillingham on the Southern Region served no useful purpose but had the effect of playing into the hands of critics of the railways. The pretext for going slow was to protest against the attitude of the British Transport Commission to the national claims for a shorter working week and increased pay for railwaymen. These claims are being negotiated in accordance with the agreed procedure and the motormen's action was condemned by their union as well as by the management of British Railways. As Sir Philip Warter, Chairman of the Southern Region, pointed out in a statement at the weekend, the public's opinion of the railways had been improving recently and the future of railwaymen depends on the continuance of this better feeling. There can be no doubt that the inconvenience to very great numbers of passengers over a wide area of British Railways has suffered a set-back as a result of the action by the irresponsible few at a critical time. The Associated Society of Locomotive Engineers & Firemen and the other unions have shown due regard to constitutional procedure in their attitude towards the present wage claim and must be considerably embarrassed by the wild-cat action at Gillingham. At a time like the present which is critical for railways, and when much must depend, so far as their future is concerned, on the fostering of public good will, it is deplorable that foolish action of the kind recently witnessed should have occurred. Both the management and the union leaders have shown commendable restraint in dealing with the situation forced on them, and one can only hope that the public, who were grossly inconvenienced for no good purpose, will appreciate that the cause lay with a very few of a grade of railwaymen usually held in high regard.

Mr. David Blee

A RE-SHUFFLING of General Managers in three Regions of British Railways has been occasioned by Mr. David Blee's decision to retire from the London Midland Region general managership at the end of this year. Mr. Blee is senior among his colleagues and has been an outstanding figure on many public occasions. His career has been bound up largely with the commercial aspects of railways, particularly with the organisation and operation of freight services. Since he went to Euston in June, 1956, one of his major preoccupations has been the largest main-line electrification project in this country, with all the problems inevitably associated with an undertaking of that kind. His deep personal interest in railway affairs, which has marked his career from its earliest stages, has also caused him to acquire a very wide overall knowledge of matters affecting not only his Region, but railways as a whole.

Justifying road haulage rates

SOME of the principal points invariably made by the railways when presenting a case for an increase in rates were used recently by the National Chairman of the Road Haulage Association, Mr. J. B. Mitchell, in justification of the 7½ per cent recommended increase in road haulage rates. Speaking at an area annual dinner, Mr. Mitchell said that, even with the proposed increase, road rates would not have risen as much since prewar as other commodities. Another point made was that unless a fair and reasonable charge was made, standards suffered and any advantage which the customer may think he had gained was shortlived. He added that the recommendation was the minimum required to cover the rise in costs which had been in force for several months, and the Association had delayed making the recommendation as long as possible. We have pointed out on more than one occasion that when the railways are faced with the necessity to increase freight rates, they have to prepare a case to put before the Transport Tribunal. The

further rise in costs, which occurs during the preparation of such a case and the deliberations of the Tribunal, negates the proposal, and renders the new rates structure inadequate.

Standard for roller-bearing axleboxes

THE British Standards Institution has just published the second standard of a series dealing with railway rolling-stock components. It is B.S. 3438, covering roller-bearing axleboxes. The first standard to be published—B.S. 3117: Part 1. Axles—specified dimensions of axle stub-ends for the fitting of roller bearings. Axlebox housings for the roller bearings are dealt with in the second standard, but no details are given of the bearing itself. Leading dimensions and suitable materials are given for a range of sizes of axlebox housings for locomotives and rolling stock fitted with bearings outside the wheels. A system of classification is used which provides for two alternative sizes of axlebox for each size of axle stub-end. An extract from B.S. 3117: Part 1 is included to give the leading dimensions of the standard stub-ends for axles. Also included is a table which gives suggested loading for these stub-ends for various railway duties divided amongst locomotives, carriages, and wagons. Copies may be obtained from the British Standards Institution, Sales Branch, 2, Park Street, London, W.1, price 5s. each.

Polish rolling-stock exports

POLAND is the fourth largest exporter of rolling-stock in the world. Since 1956, exports have risen from $47 million to $58 million in 1960, but there has been a major change in the nature of these exports in recent years. In the past a considerable percentage of the value has been attributable to the sale of steam locomotives but the sale of these has now been completely dropped. There has been a very substantial development of the sale of passenger coaches, specialised goods vehicles, tank wagons, and hopper wagons. In the first half of this year, Poland exported rolling-stock worth about $29 million. As might be expected the Soviet Union is the biggest importer taking over 80 per cent of the total export. Other importers include Hungary, Yugoslavia, China, East Germany, Rumania, Great Britain, and the Argentine. The major part of the country's electric rolling-stock is imported. Polish industry only started to manufacture this about two years ago, and the biggest suppliers are Hungary and Czechoslovakia.

The "Rheingold Express"

WITH the introduction of next summer's timetable considerable changes are to take place in the working of the "Rheingold Express," which—in conjunction with the comfortable steamers of the Harwich-Hook of Holland route—has become an increasingly popular means of travel to and from South Germany and Switzerland. From May 27, 1962, it will revert from the Venlo route between Rotterdam and Cologne to the original route *via* Emmerich and Düsseldorf. It will thus provide a direct service from London to the Ruhr, and will also pick up at Utrecht through coaches from Amsterdam to Basle and Milan. Up to 1939 this train was composed of a fine set of first and second class saloon cars, but since the war standard German stock has been used, and from the abolition of third class on the Continent it has been first class only. For next summer a new saloon train is being built, including a "dome" car for the enjoyment, in particular, of the scenic stretch of the Rhine valley. Electrification has greatly increased the speed of this express, now due in Basle as early as 3.45 p.m., and not leaving on the northbound run until 2.43 p.m.

Developing railway property

CANADIAN NATIONAL RAILWAYS is reassessing the property it owns with a view to development projects which would be of mutual benefit to itself and industry. The General Manager of Real Estate, Mr. H. M. Blaiklock, said recently that this plan "would be a joint action between the railway and private investors to unite their interests in commercial undertakings, taking advantage of the convenience of existing railway facilities." The type of project contemplated would be one where a development company would rent or buy C.N. property and erect on it commercial buildings in which the railway might rent space. This would be used for administrative offices, ticket offices, and express or freight warehouses. Other possibilities for joint development exist in the aerial rights or overbuilding of existing Canadian National Railway stations and other buildings, and a more concentrated use of space in such structures as suburban stations. Canadian National Railways will conduct an advertising campaign urging potential developers to get in touch with its estate offices and discuss possibilities.

Eye appeal of clean locomotives

ON THE mainland of Europe, locomotives, even of the steam variety, are usually kept clean externally. Passenger coaches in general do not receive the same attention, except those of crack trains like the French "Mistral," the Italian "Settebello" or the T.E.E. trains. In Britain, curiously enough, the opposite is the case. Main-line passenger stock, with the help of carriage-washing plants, is usually kept in an attactive condition, but it is seldom possible to say the same of the locomotives. Some Regions, the Western in particular, still manage to keep their steam locomotives commendably clean, but on others, even new main-line diesels, which, so far as the bodies are concerned, are far the easier of the two to clean, soon degenerate into a very dingy condition. We notice that at Liverpool Street Station on the Eastern Region, one or two cleaners are stationed permanently, to give cleaning attention to diesel locomotives during their turn-round time at the terminus. This is a relatively inexpensive but valuable means of appeal to the public eye which is well worth consideration elsewhere.

Subsidised competition in the United States

THE difficulties with which the railways of the United States have to contend are well exemplified by a series of statistical tables which were assembled earlier this year by the Bureau of Railway Economics of the Association of American Railroads. They set out the Government expenditures for construction, operation and maintenance of transport facilities by air, highway and waterway and, in contrast, the private expenditures for construction, maintenance of way and taxes on railway facilities. The former category, which includes both Federal, State, and Local Expenditure, totalled in 1959 no less than $12,280 million, whereas the latter category, which the Class I line-haul railways had to meet from their own resources, amounted to $1,398 million. It is hardly surprising that the American railways are appealing for a fairer deal and relief from heavy taxation.

America imports locomotives

IT IS over 50 years since the Pennsylvania Railroad Company imported locomotives from Europe. Now two companies, the Southern Pacific Company and the Denver & Rio Grande Western Railroad Company, have ordered six locomotives from Krauss-Maffei A.G. of Munich. The most significant feature of this order is perhaps the fact that the locomotives are diesel-hydraulic with Maybach engines and Voith turbo transmissions and most important of all Voith hydro-dynamic brakes. With the exception of the Budd R.D.C. railcar, the U.S.A. has long held out against the use of the hydraulic drive despite some attempts to introduce it. Last year, in an address to the Association of American Railroads, electrical section,

Mr. W. D. Lamprecht, Vice-President of the Southern Pacific, stated that his company's chief reason for ordering this type of locomotive was the repeated failure of electric traction motors in heavy mountain freight service. The proof of the hydraulics would appear to depend less on their train-hauling ability than on their reliability. The performance of these six locomotives will doubtless command close attention throughout the United States during the next two or three years.

Soil profile photography

UNTIL recently, the investigation of soil profiles—a study of considerable interest to railway civil engineers—has involved the excavation of a large and deep trench which had to remain open while the expert wrote a long and detailed description of the soil profiles encountered. The record was usually supported by black and white photographs, rarely of great practical value. In an attempt to overcome the limitations of black-and-white photography the British Iron & Steel Research Association has experimented with three-dimensional colour photographs of soil profiles. With the aid of relatively inexpensive equipment, colour stereophotographs have been obtained which were so successful that only brief notes were needed on the site to provide enough information to compile a full soil analysis at a later stage. The choice of equipment was simplified by the fact that soil profiles are classified as "still life." A single-lens waist-level reflex camera fitted to a special stereohead was adequate to take stereo pairs of photographs. The unit was mounted on a telescopic tripod fitted with a jointed head to allow correct alignment of the camera with soil profiles.

Electric locomotive building in India

AFTER completing in October the first electric locomotive to be built in India, the Chittaranjan Locomotive Works have been allotted the task of building all future a.c. and d.c. locomotives, both broad- and metre-gauge, required by the Indian Railway Board's Third Plan, a feature of which is a drive towards self-sufficiency in motive power production. The first electric locomotive from Chittaranjan was one of 21 Co-Co units of 3,600 h.p. for the 1,500-V. d.c. system of the Central Railway, similar to those supplied in 1955 by the English Electric Co. Ltd. In the present instance that company has been responsible for the electrical equipment and has collaborated in various technical aspects of the work. Under the electrification programme, Chittaranjan is charged with manufacturing mechanical parts, installing the electrical equipment and turning out locomotives ready for the road. Its present commitments, in addition to completing the d.c. series, comprise 57 broad-gauge a.c. freight locomotives and 16 a.c. metre-gauge mixed traffic locomotives, while it may also be required to produce some 20 a.c. broad-gauge mixed-traffic locomotives. An output target of six locomotives a month has been set. In future, electrical components, both for locomotives and multiple-unit trains, will be made at the Bhopal plant of Heavy Electricals, India, while production of multiple-unit coaches will be shared between the private sector of industry (d.c. stock) and the Integral Coach Factory, Perambur (a.c. stock).

The shape of things to come

THE sweeping changes announced by the British Transport Commission in the composition of its area boards and in the general management of three of the six railway Regions are the first fruit of the reorganisation now taking place at Marylebone Road. It seems fairly obvious that the retirements and appointments now announced are in anticipation of even wider changes which will be made during the progress of the Transport Bill and are a preparation for the new shape of nationalised transport in this country as envisaged by the White Paper of last December, and put into legal form by the time the present Bill will come into being. The reorganisation of some of the manpower of the area boards is in preparation for the time when it will be legally possible to establish the Regional railway boards. The final shape of the new organisation now being evolved may not be known for some time, but it is clear that preparations for the passage of the Bill are proceeding actively and that, by the time it becomes an Act, the framework will have been completed. In effect, therefore, the wishes of the Government and the assent of Parliament will have been anticipated. It would appear that the generally expected vesting date of the beginning of 1963 will see very great changes in the personnel and deployment of railway management as well as the new style of administrative shape. In the re-shuffle of General Managers, there would appear to be an endeavour to provide an opportunity for younger men to show their talents in undertaking the administration of lines with which they are less familiar than those they have previously served. Whether there are to be further changes at this level is not as yet known, but it would seem not improbable.

The actual formation of the Regional Railway Boards must await the enactment of the Bill, but there can be little doubt that these bodies are beginning to take shadow form.

The new position of Chief Commercial Office at B.T.C. headquarters, which is being filled by Mr. David McKenna, is in accord with the policy of building up a strong commercial organisation for British Railways and, in conjunction with Mr. G. F. Fiennes, who was recently appointed Chief Operating Officer of British Railways, should do much to assist in the progressive development of the railway commercial services. This looks like a strong two-man team which should prove capable of doing a great deal in a matter which will become of increasingly vital interest to the railways as a whole.

The Argentine railway strike

THE Argentine railway strike, the most serious for nearly 50 years, entered its fourth week with no sign of a settlement. The Government attitude had stiffened noticeably, while there were signs that the labour front was cracking.

The general strike called by the C.G.T. for November 7, 8, and 9 was a failure, at least in the cities, where activities were practically normal, and its effect was felt only in industrial centres. The Government declared a "state of national emergency" and issued a decree under which railway personnel considered indispensable for operating essential services could be "requisitioned." Some 300 men were called up under this decree and, together with superior staff and volunteers, a limited train service was begun on the suburban sections as from November 6. The "requisitioning," at first limited to a 60-km. radius from Buenos Aires, was later extended to the whole country, but has now been suspended as sufficient men are available for the emergency services. A total of some 400 trains per day on all the lines is being run, carrying about 250,000 passengers. Long-distance trains are being run at irregular intervals.

A "Transport Safety Command" has been set to provide protection for rolling-stock and property. Fuel trains and those transporting food have been declared essential and will run under heavy military guard.

The first days of the strike were not marred by any serious incidents, but this state of affairs was soon broken by a mass attack on a passenger train by some 3,000 persons at Laguna Paiva, Province of Santa Fé. Sleepers were piled on the rails, and when the train stopped, more were placed behind it so that it could not proceed either way. The train was attacked with firearms and Molotov bombs, and when the police guard ran out of ammunition, the eight coaches were burned.

Such is the situation at the moment. The Government has announced that no negotiations will take place while the strike continues, but information from reliable sources states that unofficial contacts have been made and there are good pros-

pects of a settlement being reached within a reasonably short period. Meanwhile, losses to the country's economy are estimated at 750 million pesos a day.

There are signs that a considerable number of men are willing to return to work, against the instructions of their union. They have collected no wages since September. Should this occur, the strike would inevitably collapse. Another 10,000 have accepted the Government's offer to give them an indemnity if they resign their posts, as well as a promise of a new house.

A seemingly incongruous fact is that the Government is calling for electric and diesel train drivers, technicians and mechanics under the slogan " new men for the new railways." Presumably striking staff will not be re-employed.

A decree has been issued granting a minimum wage increase of 20 per cent to those employees who are in service on January 1, 1962. From that date the new men's representatives will be granted seats on the board of directors of E.F.E.A. The decree also outlined the manner in which railway workshops are to be transferred to the men. The railway printing shops of the San Martin, Belgrave, and Urquiza lines have been transferred to the men, as have the quarries at Dean Funes, Province of Cordoba.

Manufacture of rolling-stock in Australia

THE existence of an indigenous railway rolling-stock industry does not necessarily preclude opportunities for sales. Indeed, the reverse applies, as is shown in Australia. There, the industry draws certain components from overseas and up to 40 per cent of the cost is often represented by imported components. Major items in this field are electrical traction and diesel engine parts. In the period 1958-59, imports of such components were estimated at £3·2 million. No more up-to-date figure for the whole industry is available (that covered the public and private sectors), but a recent survey indicated that over January to June, 1961, the private sector imported components valued at £750,000. It is estimated for the three months following that the figure was £600,000.

A newly published survey of the Australian railway rolling-stock industry shows that both the Commonwealth and State railway authorities can obtain almost a full range of equipment from the industry. The modest demand from industrial and rural enterprises is likewise met from this source.

Altogether, there are 17 companies engaged in the building of railway stock in the Dominion, apart from the railway authorities themselves. The main centres of the industry are in Queensland and New South Wales, but not all of the 17 companies are engaged exclusively on such production. For many, it is a complementary line.

From a survey of 12 firms, who between them represent over 90 per cent of local production, it was ascertained that in May this year the output value in the private sector was six per cent greater than in the same month of 1960. Naturally, the figure in individual plants varied according to distribution and completion of contracts. Moreover, the diverse nature of traditional engineering operations engaged in by these manufacturers tended to cloud the true statistics. A fairly accurate assessment would be about two-thirds of capacity was geared to the railways.

The accompanying table shows expenditure on new rolling-stock, including locomotives, by the mainland railway authorities since 1955-56. The figures include stock built in railway workshops.

The New South Wales Government absorbs the major portion of current annual expenditure, 45 per cent of the £15 million spent. Victorian railways follow with 25 per cent.

The greatest single item, value £5 million, is expenditure on diesel locomotive contracts. Private enterprise manufacturers, equipped to make rolling-stock, have had limited opportunities in this field due to railway workshops being able to provide a substantial proportion of rolling-stock construction. The Victorian and West Australia Government Railways are equipped to produce both rail cars and passenger and freight rolling-stock, and consequently undertake much of this work.

Undoubtedly, the practice of the railways giving work to one or at most two companies at a time, has a slightly adverse effect on the private company. On the other hand, the railways thereby benefit from lower costs. This is the prime factor in compelling manufacturers to concentrate on other engineering lines to keep them going during such lean periods as when their tender is unacceptable. All in all, however, unallotted contracts at present indicate a reasonably stable future for the industry as a whole.

Australia's exports of rolling-stock follow a see-saw pattern. Recently, they have shown a marked decline. In 1958-59, for example, they were valued at over £2 million, but reduced to £645,000 in 1959-60 and only just over £¼ million in 1960-61. On the other hand, Colombo Plan contracts account for the bulk of exports. Australia has recently become acutely export-conscious. Whether or no Britain enters the European Economic Community, this trend will continue. We may, therefore, expect to see an increasing effort to acquire overseas business, although previous efforts in this direction have been nullified by more competitive European, American, and Japanese tenders. Extended credit terms offered from elsewhere have been another limiting factor.

Costs and prices remained fairly stable during this year. Such slight increases as there have been are attributed to small rises in the cost of materials. The industry confidently expects to hold prices for at least a year, and, indeed, has absorbed this year's increased costs.

All in all, the industry is maintained at a reasonably satisfactory level of activity. This situation will pertain so long as the railways continue to place steady orders. With increasing industrialisation, the prospects for a continuous demand look fairly secure. That can only be the overall picture. Units within the industry itself must inevitably feel periodic draughts so long as orders are confined to a minimum number of firms and conditions will be highly competitive.

Already a number of British manufacturers of all types of railway equipment are established in one form or another in Australia. There is an increasing tendency in this direction usually to manufacture in partnership with a local firm. The range of requirements for the railways is extensive. Demand is not limited exclusively to that outlet. Industry itself needs ancillary equipment and the British industry will overlook these aspects of the market to its decided disadvantage.

EXPENDITURES ON ROLLING-STOCK BY MAINLAND RAILWAYS AUSTRALIA*

£'000

	1955/56	1956/57	1957/58	1958/59	1959/60	1960/61
Commonwealth Railways	293	3,233	1,133	401	350	500
N.S.W. Railways	5,277	4,845	6,635	5,730	7,130	6,700
Victorian Railways	4,516	4,188	3,645	3,283	3,345	3,972
Queensland Railways	640	1,088	1,908	531	1,352	n.a.
S.A. Railways	1,819	1,758	1,706	1,292	2,035	1,855
W.A. Railways	1,125	1,386	484	403	889	900†
	13,670	16,498	15,511	11,640	15,101	n.a.

* Other than Tasmania † Estimated Source: Commonwealth Statistician

Pakistan Railways second five-year plan

THE following are some of the principal items covered by the Pakistan Railways second five-year plan. Against a total provision of £62¾ million for locomotives and rolling-stock, 150 locomotives are to be purchased for the Western and 68 for the Eastern Railway. The corresponding figures for coaching stock are 429 and 486 units, and for wagons in terms of four-wheelers 8,642 and 6,121 units. For plant, machinery, and telecommunication equipment £2¼ million is allocated, and for track renewal £17¼ million. This figure is to cover a programme of 677 miles of track renewed with new rails and 584 miles with secondhand rails, 1,281 miles with new sleepers and 1,269 miles with secondhand sleepers.

For bridgework an outlay of £4·8 million is envisaged,

£1·8 million for additional flood openings and protection works, £1·43 million for the construction of the new bridge over the Indus, and £1·57 million for re-girdering certain large bridges. Improved signalling merits a provision of £2·85 million, with which it is intended to provide 81 stations with relay interlocking and seven with track-circuiting. The standard of interlocking is raised at 36 stations and interlocking is to be provided at 62 non-interlocked stations. Centralised traffic control is to be installed between Tangi, Dacca, and Narayanganj. A sum of nearly £5½ million is to be devoted to remodelling and expansion of yards, crossing stations, loops, terminal facilities, and other traffic requirements. Other allocations are £1·95 million for workshops and £7·65 million for miscellaneous engineering works, including £2·6 million for staff quarters, schools, hospitals, and other facilities.

More interesting are the programmed construction schemes. They are expected to cost £13·2 million during the second period, and include the following on which work is already in progress: Karachi circular railway (£2·6 million) and Dacca realignment (£1.3 million). Of the other constructions to be undertaken, the most important is the Kashmor-Kot Adu link—some 160-170 miles—for the first 48 miles of which from Kot Adu to the important town of Dera Ghazi Khan, £5¼ million is allocated in the five-year period. Kot Adu is on the east bank of the Indus and D.G. Khan (as it is known) on the west, and it is understood that the railway will be carried across the river on a barrage being or to be constructed for irrigation purposes. The only other provision of any great interest is £1½ million for the conversion of the 42-mile Hyderabad-Mirpur Khas section of the old Jodhpur-Bikaner Railway, now in Pakistan, from metre to broad gauge.

The total outlays programmed for the five years are £84·82 million for the Western and £36·9 million for the Eastern Railway, making a total of £121·725 million. The Government realises that, because of delays in supplies of equipment and materials from abroad, the total may possibly prove to be nearer £150 million.

Advantages of W.A.G.R. standardisation

EDITORIAL reference has already been made (October 6) to the terms of agreement between the Commonwealth and Western Australian Governments in connection with the construction of a 4-ft. 8½-in. gauge trunk system in that State. Additional information has been revealed in the State Government's presentation of the agreement for ratification. There still seems to be some doubt regarding the position of the marshalling yard or yards variously described as at Welshpool and at Kewdale, and whether the new line onward to Kwinana is to be of standard or of mixed gauge.

The State Government points out that the mixed-gauge realignment between East Northam and Midland Junction, with its ruling gradient of 1 in 200, will not only benefit standard gauge traffic from Kalgoorlie and the iron ore deposits at Koolyanobbing, but also existing and continuing 3-ft. 6-in. gauge traffic from the Great Southern and other lines of that gauge converging on East Northam, and destined for Perth, Fremantle, and Kwinana. This 3-ft. 6-in. gauge traffic will not have to negotiate the sharp curves and 1-in-40 gradients, requiring banking engines, on the existing tortuous line via Clackline.

In fact, the cost of providing a third rail along the realignment through the Avon Valley is £2,550,000 as part of the whole of £41·2 million project, but, as a result of this outlay, the present annual loss of the Northam-Midland Section assessed at £547,000 is expected to be converted into an annual profit of £90,700. In other words, the relocation should improve operating results by nearly £638,000 a year.

It has been estimated that the value of rails, sleepers, bridges, buildings and other structures recoverable from the 3-ft. 6-in. gauge sections to be closed and usable elsewhere will be some £1,930,000. Furthermore, 3-ft. 6-in. gauge rolling-stock to the value of about £5,360,000 will be released to replace obsolete and average stock on other parts of the system. Altogether, therefore, the W.A.G.R. administration will be saved nearly £7,300,000 in the provision for betterment of its existing property. This is a larger sum than Western Australia has to provide initially for the whole project from its loan funds.

Another consideration is that quite apart from the army of workers that will be employed indirectly on the provision of ballast, sleepers, locomotives, rolling-stock and other equipment, some 1,800 men will be directly employed on the construction works for six years. Earthwork contracts alone will be worth £4,500,000, representing large numbers of man-hours and machinery drivers. Other estimated costs are £2¼ million for bridges, £1 million for buildings and other structures, and £2½ million for signalling and telecommunications; over 2 million cu. yd. of ballast will also be required. Locomotives and rolling-stock are likely to cost a further sum of £11 million and their construction will employ 500 men each year. The work on and in connection with the building of the railway will therefore provide very considerable employment and reduce unemployment.

Additionally, the building of the blast furnace and steel mills at Kwinana, made possible by standardisation of the railway, will employ many more men, as will also the inevitable establishment of other industries and the development of trade generally. An influx of population will be axiomatic and opportunities for the younger generation will increase at home instead of going to other States or countries.

The new construction will be of such a standard as to enable 80-ton wagon stock to be freely used, and passenger-train speeds to attain or exceed 70 m.p.h. The engines and stock will be interchangeable with those of the other States having 4-ft. 8½-in. gauge systems. This will be possible via the Kalgoorlie-Port Pirie, Commonwealth Railway and thence via Broken Hill to New South Wales in the comparatively near future, and via Adelaide and Melbourne later.

It is noteworthy that in the metropolitan area the standard-gauge line will tap the following industries: superphosphates and machinery at Bassendean; machinery at Maylands; steelwork, pipes and general goods at Subiaco; motor-car bodies at Cottesloe; wheat and other harbour exports at North Fremantle; and wool and general exports at Fremantle.

Trans-shipment between 4-ft. 8½-in. and 3-ft. 6-in. gauge lines at Coolgardie, Merredin and East Northam will be necessary, but it is claimed that its cost will be more than offset by elimination of the existing trans-shipment carried out between the Commonwealth Railways standard-gauge stock and W.A.G.R. 3-ft. 6-in. gauge stock in the Koolgardie area.

Automatic coupling of railway vehicles

THE railway networks of all European countries, with the exception of the U.S.S.R., use a hand-operated system of coupling for connecting up vehicles and forming trains. The railways in the United States, the U.S.S.R. and Japan employ a type of coupler which automatically couples up vehicles as soon as they come into contact, as does London Transport. An automatic coupler has no components which require raising by hand. It can be made much stronger than a manually-operated coupler and heavier trains than those run at present can be formed. While in Europe the heaviest trains very rarely exceed 3,500 metric tons, automatic coupling enables trains of 10,000 metric tons to be run, as is the case in the United States. As the coupling of vehicles fitted with automatic couplers is instantaneous, faster marshalling and train formation operations enable wagon turn-round to be improved. As the wagon output potential is higher, less rolling-stock is required to transport the same quantity of goods. There is much less risk of saturating marshalling yards. Standing time can be saved at passenger stations when sections of trains arriving from several points have to be coupled up.

Member railway networks in Europe of the International Union of Railways have come to the conclusion that the introduction of automatic coupling is becoming imperative. The problem has also been studied by the Council of Ministers of the European Conference of Ministers of Transport (E.C.M.T.); the International Labour Office, the United Nations Economic Commission for Europe, and the Council of Ministers of Transport of Eastern European Countries. On November 29, 1961, the initial results of the technical studies undertaken by railway experts in association with industrial concerns to design a modern automatic coupling system adapted to the requirements of the European railways were demonstrated for the first time to senior railway officers from all European railways and a large number of General Managers of networks situated all over the world who were in Paris to attend the General Assembly of the U.I.C. Following a call in 1960 from the U.I.C. for tenders, various systems were proposed by several countries, and these were demonstrated.

LETTERS TO THE EDITOR

THE EDITOR IS NOT RESPONSIBLE FOR THE OPINIONS OF CORRESPONDENTS

CO-ORDINATION?

November 20

SIR, The remarks of Dr. Beeching as recorded in your issue of November 10, are laudable in the extreme, but I should like to know how he proposes to implement them, seeing that a co-ordination of all forms of transport is an object to which the present Government, committed to a policy of free competition in the transport world, does not subscribe. If he has in mind the shedding of railway traffic regarded as unsuitable, what guarantee is there, under present conditions, of obtaining compensating business for which the railways are better suited?

Yours faithfully,

C. W. HERBERT

26, Princes Drive,
Harrow, Middlesex

RAILWAYS INTO ROADS

November 16

SIR, I am convinced that the railway conversion brigade are using their arguments about roads reserved for motor coaches purely as a white elephant.

If they are so concerned about increasing the passenger carrying capacity of our roads why don't they recommend that certain existing roads should be so reserved, e.g. two lanes of the M.1 or certain roads in the centre of London.

Yours faithfully,

D. OSMAN

7, Warren Street,
Alvaston, Derby

November 27

SIR, Mr. R. G. R. Calvert's attack on the railway conversion project, in your issue of November 17, seems to amount to a spatter of grape-shot propelled by an emotional charge! The shooting was wildly inaccurate.

In referring to the number of passengers with which "converted roads" would have to cope in the London rush-hour, Mr. Calvert added 292,600 who at present travel by *underground*, making a total of 528,900, instead of the 236,300 which correctly represents the number who at present travel by British Railways.

His assumption that all commuter buses would stop at all stations must originate in his own head: it has not, as far as I know, ever been suggested by the Railway Conversion League. He also assumed that no bus would be able to stop without all those behind it doing likewise. He had apparently not considered that at all stations the removal of platforms would create ample space for buses to pull into loading bays, clear of the traffic lane. His contention that a railway track would not accommodate a 12-ft. traffic lane could only apply, possibly to rare and obscure parts of the railway network. It should be noted that they have managed very well without a central reserve in the two-lane tunnels (6½ miles) of the Pennsylvania Turnpike. The accident rate is lower in the tunnels than elsewhere on the road and this, in turn, is less than one-quarter of the accident rate on British roads.

Mr. Calvert spoke of "the awful truth that buses and lorries require many more men to run them than trains." If the "awful truth" is to be faced let it be the real truth, in which connection let the following calculation be examined. The basis of the calculations is information published in the Annual Report and Accounts of the British Transport Commission, Volume II, 1960:—

Staff employed by British Railways:		
Average number of staff employed in 1960		501,283
Clerical and salaried staff working 42-hr. week		65,000
Other employees working 44-hr. week		436,283
Hours for which staff are paid:		
Per week:		Hours
By 42-hr. per week staff (42 x 65,000)		2,730,000
By 44-hr. per week staff (44 x 436,283)		19,196,452
Total normal hours per week		21,926,452
Per year:		
52 x 21,926,452		1,140,175,504
Add estimated 25 per cent for overtime (Average earnings are approximately 35 per cent above basic rates)		285,043,876
Total normal and overtime hours paid for		1,425,219,380
Deduct 5 per cent presumed to be devoted to earning 5 per cent of B.R. income derived from activities other than moving trains		71,260,969
Total hours which must be paid for out of the takings from train movement		1,353,958,411
Train-hours in traffic (source of income):		
Coaching trains		14,540,000
Freight trains		13,237,000
Total-train hours in traffic		27,777,000
Man-hours per train hour in traffic:		
Man-hours per year	1,353,958,411	= 49
Train hours in traffic per year	27,777,000	

Thus each train-hour in traffic corresponds to 49 man-hours for which staff are paid. Put in another way, it means that the "crew" of each train (the number whose full-time services are required in order to enable that train to run) is not two or three men, as the upholders of railway manpower economy would have us believe, but 49 men! If this calculation is wrong, let it be shown wherein the error lies; otherwise perhaps it may be regarded as disposing of the argument that it is necessary to retain the railway system in its present form because of its economy in manpower.

Mr. Calvert refers to "average" train loads of 300 passengers and of 300 tons of freight. The B.T.C. Report for 1960 shows that in that year the respective averages were 95 passengers and 152 tons of freight.

Mr. Calvert was mistaken about my journey on the Great Central Line. It was on a Wednesday, not Saturday.

There was an error in my letter, the station I mention should have read "Stoke Mandeville."

Yours faithfully,

M. J. DOUGLASS

Hallams Heath,
Shamley Green, Guildford

The Scrap Heap

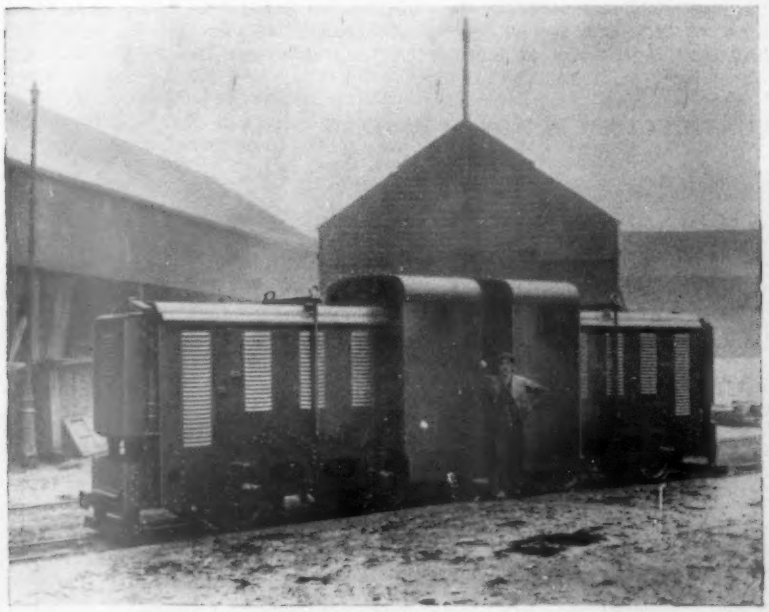
Beckton locomotive preserved

The Industrial Locomotive Society has acquired Beckton locomotive No. 25 for preservation. The locomotive, which is in excellent condition, has been transferred from Beckton Gasworks, where it had served for nearly 65 years, to Sheffield Park, where it will go on display. The first of its class was built by Neilson & Company in 1883, and was number 14 in the gas company's stock. This was followed in 1885 by No. 16, again built by Neilson. An order was placed for a similar locomotive with Black Hawthorn & Company of Gateshead and was delivered in 1886. Two more engines of this class were built, in 1890 and 1896, both by Neilson & Company. These engines were designed to pass through the restricted entrances to the horizontal retort houses and besides being cabless were restricted in overall height, being about 6 ft. 6 in. to the top of the chimney. The saddle tank covered the boiler barrel only and did not extend over smokebox or firebox. The cylinders were steeply inclined with valve chests above. The valve spindle was operated by a rocking shaft driven by link motion between the frames. Single slidebars were provided which, together with the inclined cylinders, kept the more important works clear of possible damage from piles of coke by the lineside. Both hand and steam brakes were fitted although it is not clear whether the steam brake was an original fitment. Central sandboxes were fitted ahead of the trailing wheels and two further sandboxes were fitted to supply sand to the leading wheels.

Beckton Locomotive No. 25

Forty-five-year-old locomotives

In 1916, Dick Kerr & Company, of Preston, now part of the English Electric Co. Ltd., supplied a number of petrol electric locomotives for military lines in France. Four of these are still in regular daily service for the French Compagnie Industrielle des Sables de Nemours. The original electrical equipment is still in use, though the petrol engines were replaced in 1930 by diesel engines. The locomotives were the first in this country to be powered by an internal combustion engine with electric transmission and are the forerunners of the modern diesel-electric locomotive.



Electric locomotive manufactured by Dick Kerr & Company

Redemption

The porters stood at the pearly gates,
Their heads were bended low,
They merely asked the man of fate,
Which way they all should go.
St. Peter asked: " What have you done "
" To seek admittance here ? "
" We worked on the platforms at Padding-
tun,
" For many and many a year."
So Peter opened wide the gates,
And gently tolled the bell,
"Come right inside and choose your harp,
" You've had your share of hell."

With apologies to the " Western Australian Railways' Institute Magazine."

Back to school

Breaking-up normally means the end of term, but the meaning is to be reversed in the Southern Region of British Railways. This Region is to break up its " Schools " class locomotives and hand over the nameplates to the schools they represent. The first to go will be *Harrow*.

Issue blessed with union ?

A notice quickly chalked on a board at Holborn Viaduct Station on the first morning of the drivers' " go slow " read: " Owing to labour trains are subject to delay." *From the " Evening Standard."*

OVERSEAS RAILWAY AFFAIRS

FRANCE

Suburban railway line

The Paris Transport Authority is providing a further suburban railway line to meet growing transport requirements. Work has begun on the first section of the line which is an underground link between La Folie on the east side of the River Seine and Etoile on the west side. Subsequently the line will be extended eastward to link up with the existing system, providing a continuous 26-mile east-west route from Boissy Saint-Leger to Saint-German.

SPAIN

Spanish Railways in 1960-61

The annual report of the Spanish National Railways (R.E.N.F.E.) for last year shows receipts of 9,589 million pesetas and expenditure of 11,217 million pesetas. The shift of passenger and goods traffic to the road services continues, freight traffic being 13 per cent less than in the previous year.

TURKEY

Locomotive manufacture

It is reported that the first Turkish-made locomotive was completed at the Eskisehir workshops of the Turkish State Railways on September 28. This oil-burning locomotive, which develops 1,800 h.p., went into service on October 29. The Ministry of Communications stated that Turkey would no longer need to import locomotives and wagons, and that the construction of a single locomotive in Turkey would save $200,000 in foreign exchange.

SUDAN

Diesel-electric locomotives

The first of a repeat order for ten, 1,850-h.p. diesel-electric locomotives built by the Vulcan Foundry Limited, a member of the English Electric group, was shipped aboard the ss. *Plainsman* at Birkenhead last month as deck cargo for Port Sudan. The English Electric Co. Ltd. last year delivered 15 similar locomotives to Sudan Railways.

MALI

Rail link study

As recorded in our issue of November 17, Soviet technicians have commenced preliminary investigation of the route to be taken by a rail link connecting Bamako, capital of the Mali republic, with Conakry, capital of the Guinea Republic. The line will join Bamako with Kouroussa, a station on the Guinea line, from Conakry to Kankan. Kouroussa lies about 600 km. from Conakry. The new railway will be 370 km. in length, 150 km. of which will be in Mali territory. The survey and mapping study undertaken by the Russians should last about a year. Guinea and Mali experts met at Bamako on October 6-7 to arrange the adoption of the final layout, to agree terms relating to co-operation necessary for study and research, and to finalise all questions relating to the construction of the railway.

Diesel-electric locomotive for Sudan Railways aboard ss. "Plainsman"

AUSTRALIA

Commonwealth Railways profit

The Commonwealth Railways made a record profit of £A.1,407,490 during the last financial year. This was partly due to a considerable increase in semi-trailer

STATION RECONSTRUCTION IN NORTH EASTERN INDIA

A view of station buildings at Allahabad

traffic which had brought in revenues of £A.732,000 compared with £A.31,000 five years ago.

VICTORIA

Sydney-Melbourne standard gauge

The first goods train to use the standard gauge in Victoria will leave Sydney on January 2, next year and reach Melbourne the following day. The first passenger train will leave Melbourne on April 16 at 6·45 p.m. and will arrive in Sydney at 8·57 a.m. the next day. The second train to leave Melbourne will be the £A.1-million sleeping-car train with dining and lounge cars which will take 13½ hr. for the journey. Passengers will no longer have to change trains at Albury.

NEW ZEALAND

Construction of diesel-electric locomotives

The Addington railway workshops has started construction of a series of diesel-electric locomotives. These will be the first of this type constructed in New Zealand. The units will be about 40-ft. long and will be powered by four electric motors linked to four driving axles. The locomotives will be the prototypes of a series of 20 of which 10 will be used in the north and 10 in the south of the South Island.

UNITED STATES

Proposed railway merger

The Great Northern Railway, which operates over 8,279 route-miles and the Northern Pacific Railway with 6,800 route-miles have for many years been the owners of the Chicago, Burlington & Quincy Railway. It has now been proposed that a merger of the three railways should take place in the interests of greater efficiency and economy.

New railway in Alaska

The United States Congress is considering recommendations by the Alaska International Rail & Highway Commission for the construction of a 380-mile railway. This would run from south of Fairbanks to the Western Yukon border, at an estimated cost of $114 million. This project would be complementary to the British Columbia plan for a 700-mile line from Summit Lake, north of Prince George to the Yukon border.

In Brief

China. Szurfang Locomotive Works has produced a double-deck train consisting of 12 coaches and having 60 seats more than the standard coach.

France. After ten years of experiments with rubber tyres on the Paris Metro, it has been decided to convert all rolling-stock to pneumatic running.

South Viet Nam. The Saigon-Loc Ninh railway line has been closed as uneconomic. The line has suffered damage from sabotage by rebels.

Spain. The "Suburbano," a six-mile electric line with two miles of tunnel, was recently opened in Madrid. Six-coach trains carry 860 passengers at speeds up to 43 m.p.h.

PUBLICATIONS RECEIVED

An Outline History of the Oil Engine and its Lubrication. Shell-Mex & B.P. Limited London, W.C.2. 8½ in. x 5½ in. 116 pp. Illustrated. This publication deals with the oil engine and its development from the 17th century to the present. The compilation has been the result of considerable research by Mr. A. P. Quarrell, A.M.I.Mech.E., A.M.I. Mar.E., for the Industrial lubricants Department of Shell-Mex & B.P. Limited. Mr. Quarrell has collected a large number of facts into a condensed and readable form. The association of oil-engine development with engine lubrication and the dependence of one on the other is brought out and accentuates the necessity for a highly-developed lubrication system in the modern oil engine to cope with the stresses due to high shaft-loading, high engine-speed, and high-temperature requirements. The book is well illustrated by photographs and diagrams and includes illustrated descriptions of a series of sea shells used as names for grades and types of Shell lubricants for marine and industrial use.

B.W.P.A. Standards for Water-borne Wood Preservatives and their application by Pressure Impregnation. Standards for use of Tanalith "C" wood preservative and Celcure "A" wood preservative have both been issued by the British wood Preserving Association, 6, Southampton Place, London, W.C.1. These standards are numbered 103 and 102 respectively. Copies are available from the offices of the Association, price 2s. per Standard. The Association accepts in their entirety three British Standards: B.S. 144 Coal-Tar Creosote for the Preservation of Timber, B.S. 913 Pressure Creosoting of Timber. B.S.3051, Coal-Tar Oil Types of Wood Preservatives (other than Creosote to B.S. 144). These Standards are supplementary to the B.S.S. and detail methods of application of the preservatives, preparation of the wood, and the specification in detail of the preservatives required.

Hunting Group Review. This excellently printed and illustrated review is published quarterly by the Hunting group of companies, Norwich House, Dunraven Street, Park Lane, London, W.1. It covers technical descriptions of work carried out by member firms in the group, articles of general interest, personal news of staff members and their families, and achievements by member firms.

New Shap Plant. A publication issued by Tarmac Roadstone Limited of Ettingshall, Wolverhampton and Harrison's Limeworks Limited of Flusco, Penrith, Cumberland, describes the new automatic-coated Macadam plant at Shap Westmorland. It includes a flow diagram of the works, as well as a map showing the geographic and operational relation of the Shap plant with other plants in the organisation. The equipment is illustrated, and operations are described. The automatic control of the plant is of interest.

T.M.C. Line Connector Leaflet. The Sales Department (Equipment Section) of Telephone Manufacturing Co. Ltd., Martell Road, West Dulwich, London, S.E.21, has made available this six-page leaflet which describes the T.M.C. Extensible Line Connector No. 1. The leaflet shows the economy of this system which enables full telephone service to be provided for up to 22 new subscribers over only four exchange lines. The leaflet gives technical details of the equipment, its performance and component parts, and describes four typical trunking schemes to show the easily extendable system.

The "Craven" Machine Tool Gazette No. 114. The magazine of Craven Brothers (Manchester) Limited, Vauxhall Works, Reddish, Stockport, covers November - December, 1961. It contains illustrated articles describing machines in production at the works as well as the Craven Sales organisation, and the range of Craven machine tools. Of particular interest to railways is the railway axle-journal re-turning and burnishing lathe under construction for the South African Railways. The machine is designed to deal with the journals of 3-ft. 6-in. gauge wheel sets and will deal simultaneously with the two outside journals of carriage, wagon, bogie, or tender sets or with one inside journal.

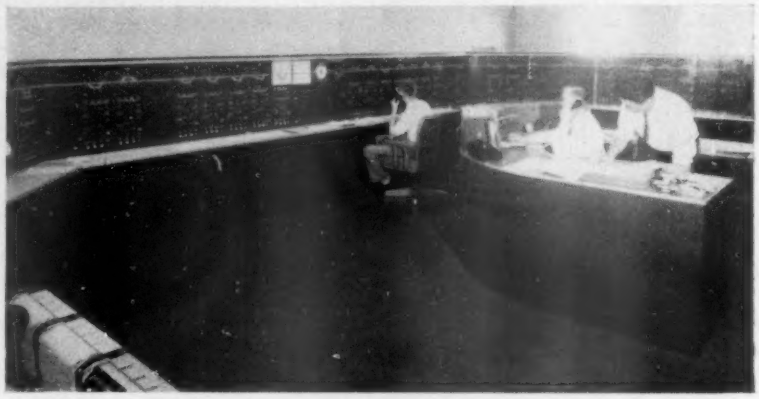
SIGNALLING AND TELECOMMUNICATION developments on Rhodesia Railways

Almost all lines and equipment now controlled by the railways in Southern Rhodesia

FOR many years the installation and maintenance of railway telecommunication lines and apparatus in Southern Rhodesia was carried out by the Post & Telegraph Department. It became apparent that to meet the demands for the expansion of railway-telecommunication facilities and the installation of signalling to provide improved methods of train control, this arrangement could not continue. Active negotiations were commenced in 1949 for the railways to purchase from the Post Office existing open-wire lines on the railway.

Progressive purchase

The first section to be taken over by the railway was the Heany-Gwelo section in 1950, and next the Bulawayo-Nyamandhlovu section in 1952. All lines and equipment were taken over between Gwelo and Umtali in 1953, and ownership throughout the main line in Southern Rhodesia was completed with the handover of the Nyamandhlovu-Victoria Falls section in 1955. Various branch-line sections have since been taken over, and all lines and equipment are now controlled by the Railways, with the exception of the Gwelo branch lines and the West Nicholson Branch. The lines in Northern Rhodesia have always remained under the control of the railways and complete ownership throughout the system will probably be achieved within the next year or two.



The c.t.c. control panel at Salisbury Station

The acquisition of these routes on the railway has facilitated the development of the railways own telecommunication network and also permitted the erection of additional lines required for operation of c.t.c. installations. Much of the line plant acquired from the Post & Telegraph Department was old and a considerable amount of work has been done to rehabilitate and overhaul these routes. An extensive programme of open-wire line construction was also necessary for the c.t.c. installations. The c.t.c. systems require two line wires from the control panel throughout the territory under control, and new lines have been erected for this purpose. The copper line wires used for this circuit are insulated with a plastic protective covering to give an additional safeguard against faults from contacts with other lines and trees.

On sections of track equipped with steel sleepers where it is necessary to instal axle counters, four line wires are required throughout an axle-counter section for the operation of this equipment, in addition to the c.t.c. control lines.

The various projects to extend c.t.c. on the main line from Umtali to Ndola will involve the erection of 4,600 miles of line wire for c.t.c. control lines and axle-counter wires. Improvements to telecommunication circuits are being carried out simultaneously with this work and some 1,400 miles of existing iron line wires in Northern Rhodesia and on the Umtali-Salisbury section are being replaced with copper conductors.

The c.t.c. control panel at Livingstone Station

Telephone trunk network

Selector-telephone circuits provided the only telephone links between Bulawayo and other District Offices for many years but carrier-telephone working was introduced in 1952 between Livingstone and Broken Hill. This system has since been extended, and today all the main centres are connected to the railway-telephone

trunk network. The carrier systems also provide telegraph channels and teleprinter circuits have now superseded the old hand-keyed morse circuits. Keyboard perforators and automatic tape transmitters are also employed to obtain maximum use of the telegraph channels.

Automatic telephone exchanges are installed and maintained by railway staff at all the main centres. A new 600-line P.A.B.X. was brought into operation in Bulawayo in 1960 and the switchboard employed on this installation is of the latest design and dispenses entirely with the use of jacks, plugs, and cords.

Emergency communications

To guard against disruption to land-line trunk circuits and to provide emergency communication links, single-side band h.f. radio stations are established at Salisbury, Bulawayo, Livingstone, Broken Hill, and Ndola. It is also proposed to equip certain vehicles with this type of equipment. V.h.f. radio equipment is also utilised for a number of services. In Salisbury, Gwelo, and Bulawayo goods express delivery vans are radio-controlled. Also in Salisbury, fixed v.h.f. stations in the Transportation Yardmaster's offices provide communication to mobile stations in vanettes and play an important role in the movement of tobacco traffic. V.h.f. radio is also employed in Bulawayo where fixed stations in the main station building and at the Mpopoma marshalling yard are in direct communication to shunting locomotives. The Railway Medical Department also operates a v.h.f. radio network which links the main Bulawayo surgery with doctors' cars, and a second channel provides communication to the station on the transportation frequency to give coverage when the surgery set is not manned.

With the extension of c.t.c. throughout the main line and the introduction of the new Regional organisation some revision of the existing telecommunication arrangements is indicated. An expansion of the trunk telephone/telegraph circuits can be expected and further developments in the use of h.f. and v.h.f. radio systems will no doubt take place.

Power-operated point machine

600-line switchboard at Bulawayo

Extension of c.t.c.

When we speak of signalling as applied to the Rhodesia Railways, c.t.c. immediately springs to mind, although, throughout the system there are busy double-line sections and stations with modern colour-light installations locally controlled from well-designed signal-boxes.

On the Rhodesia Railways c.t.c. has been steadily extended since 1951 when the original " pilot " scheme was brought into use from Heany Junction (20 miles from Bulawayo and the end of the double-track section) to Shangani, which is near the scene of the famous " Shangani Patrol." Since then the standard of the installations has been improved and more facilities and refinements added.

Power-operated points

The original installations retained hand-operated facing points which were electrically released by the Controller and operated by the train crews. This was time wasting, and, although overall running times were improved, it still took 10-15 min. to effect a crossing. Now the main-line points are controlled from the c.t.c. machine by power-operated dual control point machines. In case of failure of the points machine, the selector lever is changed from " power " to " hand " and the points controlled by the hand throw lever which operates the point tongues.

To obviate the necessity of the controller having to change the points back and forth when shunting is proceeding at a siding, a " local control " stand is provided adjacent to the main-line facing points enabling the guard to take over control and operate the points as required.

On the earlier c.t.c. panels it was necessary to send a code from control to normalise the circuits in the field, this is now done automatically, and the old panels have been modified to bring them in line with the later pattern.

At almost every siding in Southern Rhodesia from Sawmills to Umtali it has been possible to obtain a power supply from the Electricity Supply Commission. Failure of the power supply is automatically shown on the control panel by an indication transmitted from the siding affected.

Diesel generators are installed at sidings where it is not possible to obtain a local a.c. power supply. These generators are switched on and off by a control code transmitted from the c.t.c. panel and an indication is given on the panel that the generator has responded to the call. A " low voltage alarm " indication is transmitted from a siding should the battery voltage fall below a predetermined level.

Installation work

Installation work is well advanced and at the present time approximately 600 miles of the main-line is controlled by c.t.c. It is hoped that the single-line sections from Umtali to Ndola will all be under c.t.c. control by 1963. It is expected that c.t.c. will soon come into operation between Zimba and Kalomo and this involves a further 35 miles with six sidings. The Livingstone control panel will then be fully operative directing

Continued on page 681

AIR-OPERATED GABLE-BOTTOM wagon in America

Side-discharge wagon of 100-ton capacity for conveying copper ore in America

BUILT by the Magor Car Corporation, a 100-ton gable-bottom wagon is among the recent developments in the U.S.A. for the conveyance of copper ore by rail. It is being used by the Kennecott Copper Corporation for service in its mines in Arizona.

The wagon, particularly adapted for use on inclined and elevated tracks, is of side-discharge type. Its chief characteristic lies in the facility with which the load can be dumped outside. This arrangement makes it an efficient and economical car for handling loose bulk material. In the fabrication of the wagon body sharp interior corners have been avoided to ensure a minimum of product retention in the wagon upon completion of unloading.

Design features

Features in the design of the wagon include all-steel welded and/or riveted construction, suitably braced and reinforced. The wagon structure is from rolled-steel sections and plates. Side frames and bolsters are of cast steel.

The body is built up of $\frac{5}{16}$-in. steel plates for the sides and ends; $\frac{3}{8}$-in. plates are used for the floor. Side plates extend the full length of the body between the corner posts and are stiffened by seven "U"-shaped inside posts each side. A 5-in. x 4½-in. bulb angle at the top and an ½-in. angle-shape pressing at the bottom extend the full length of the wagon.

The floor plates are sloped at 40 deg. from the horizontal and extend from the centre cross-ridge to end in one piece. They have built-up supports at the end, bolster, centre cross-ridge, and intermediate between bolster and centre cross-ridge. The floor is stiffened at the bottom edge by a 6-in. x 4-in. x $\frac{3}{8}$-in. angle for its full length. The longitudinal ridge hood is of ½-in. Man-ten steel, formed to suit the slope of the floor plates. The centre cross-ridge hood is formed from $\frac{3}{8}$-in. Man-ten steel.

The underframe centre-sill is of "AAR" standard section, 36.2 lb. per ft. Bolsters are of $\frac{3}{8}$-in. web plate with ½-in. bottom cover plates. The bolster web is reinforced at the side bearings by welded gussets and at the centre sills by top and bottom cover plates, connecting to the centre sills.

Bolster centre fillers and strikers are of cast steel. The centre fillers with integral rear-draft lugs are securely riveted to the centre-sill web.

The wagon has four doors, two on each side, each of which is hinged at the top. They are built from rolled-steel sections and plates, and properly stiffened. The door plate, $\frac{3}{8}$ in. thick, is reinforced longitudinally and transversely.

Interior of wagon showing rounded and tapered construction to prevent material retention

Door-operating mechanism

The doors are air-operated by linkage, mounted on an operating shaft extending throughout the length of the wagon body, and the linkage engages each door at two points. The shaft is operated by an air cylinder through a rack-and-gear mechanism located at centre cross-ridge. Provision is made for the automatic latching of doors in the closed position.

The wagon is designed for single-discharge operation. The operating valve is arranged for operation from an elevated platform alongside track.

The system provides for the air to be supplied from the air-cylinder valve through a choke-and-check valve. This valve prevents back flow of air from the door-operating system to the train line, thus preventing any interference of that system with brake operation.

The wagon has narrow pedestal-type bogies made of cast steel incorporating the "self-aligning spring plankless" design, and arranged for use with roller bearings to facilitate easier movement and fast changing of wheel pairs.

The bogie side-frames and bolsters are designed for 100-ton capacity. The bolsters have integral centre plates and friction side bearings.

The brake beam, made of cast steel, is of the unit type. Threaded joints, laps, welds or rivets, which tend to loosen and thus develop false piston-travel, have been completely eliminated. The brake shoes are of "AAR" standard design, 2 in. thick. They are fitted with "lockey" brake-shoe keys, which hold brake shoes and heads firmly together, thereby eliminating brake-head wear and preventing loss of brake shoes and keys by chattering brakes.

The wheels are made from wrought steel. They are 33 in. in diameter—and of the multiple-wear variety. The axles are forged steel with 6½ in. x 12 in. journal dimensions.

The bogies are fitted with Hyatt

heavy-duty roller bearings. Combined radial and thrust loads are carried by the two rows of cylindrical rollers. Thrust loads are absorbed by the external flanges of the inner races and the internal flange of the outer race or housing, which contact the opposite ends of the rollers. The rollers are properly spaced and kept in alignment by one-piece separators made of special wear-resistant bronze.

Braking system

The wagon is equipped with an air brake of the American Westinghouse "ACEL" type. Empty and loaded freight-wagon brake apparatus vent with automatic changeover and type "D" automatic slack adjuster and release valve, are included in the equipment.

The automatic empty and loaded brake provides the desired smoothness and flexibility of control for the car when empty and at the same time makes available adequate brake control when it is heavily loaded and operates on descending grades.

The slack adjuster is completely automatic-pneumatic. It operates through a piston, pawl, spring, ratchet nut, and screw to take up slack. Pneumatic operation eliminates false take-up of slack from train shocks.

All pipes are securely attached to the wagon underframe with forged-steel "U" pipe clamps. "Wabcoseal" angle cocks and fittings are fitted throughout to insure airtight and non-breakable joints.

Brake rigging parts such as levers, rods, and pins are all designed to carry forces resulting from a maximum cylinder pressure of 80 lb. per sq. in. without exceeding the "AAR" specified stress limits for these parts.

A vertical-wheel handbrake is fitted at one end of the wagon. It is securely attached to the wagon body and connected to the bodybrake rigging so as to apply braking power to all eight wheels of the wagon.

Draw-gear

The drawgear is of friction type. High absorption is characteristic of this particular drawgear, in combination with low reaction. Shocks are absorbed without transmitting excessive forces to the wagon structure and its contents.

"AAR"—type "E" couplers are fitted. Yokes and combined striker and front lugs are of cast steel. Knuckles and locks made from high-tensile cast steel.

The entire outside surfaces of the body and underframe are painted with one coat of zinc-chromate primer followed by one coat of high-build hot-spray freightwa gon black paint. Lettering and numbering are stencilled with white lead in oil. The inside of wagon is left unpainted. Bogies are finished with one coat of body finishing paint.

Leading particulars of the wagon are as follow:—

Inside length	29 ft. 6 in.
Inside width	10 ft. 10 in.
Length over strikers	31 ft. 9 in.
Length over coupler-pulling faces	34 ft. 3 in.
Width over sides	10 ft. 10.5/8 in.
Height, top of rail to top of wagon	10 ft. 3.15/16 in.
Height, top of rail to bottom of body-centre plate	2 ft. 1⅞ in.
Track gauge	4 ft. 8½ in.
Bogie wheel base	5 ft. 8 in.
Estimated cubic capacity ...	1,800 cu. ft.
Load weight	190,000 lb.
Estimated weight of the complete wagon	61,000 lb.
Total weight on rail	251,000 lb.

Signalling and telecommunications development on Rhodesia Railways

Concluded from page 679

main-line train movements from Thomson Junction (Wankie) to Kalomo, a distance of 162 miles (excluding the double track immediately north of Livingstone). In Northern Rhodesia work is being intensified on installing equipment on the Broken Hill to Ndola section.

Another section of c.t.c. that has just come into operation in Southern Rhodesia is the 45 miles of line from Salisbury to Marandellas and there will be a further extension of 41 miles from Marandellas to Headlands before the end of the year.

In Southern Rhodesia, with the exception of certain sections on the Salisbury-Umtali section, wood sleepers are in use, whilst in Northern Rhodesia the track is mainly steel sleepered. In every case where steel sleepers are used, the main line, to a distance of approximately 2,400 ft. each side of the facing points, is relaid on wood. Axle counters are used for block section proving in steel sleepered areas and have given good service. Various modifications have been made to the equipment over the years, in the light of experience. One of the most difficult troubles to overcome was miscounting caused by engines with flangeless wheels passing over the counters. However, by fixing permanent magnets to the engine frames in line with the flangeless wheel, this difficulty has been largely overcome.

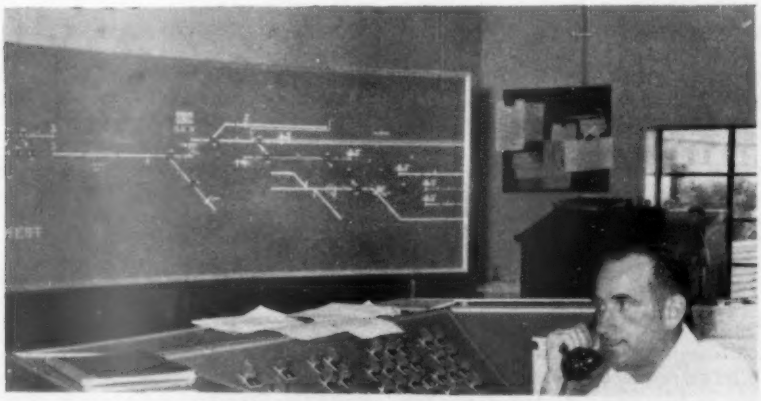
All the major centres and double-line sections are controlled by colour-light signals operated from local signal cabins. Where there are long sections between boxes, intermediate auto-signals have been installed.

The double-line sections are track circuited throughout and block bells are used for train description purposes. Where the local boxes are situated with c.t.c. on either side, the advance starters are slotted with c.t.c. and jointly controlled.

Flashing light warning signals are provided at many of the main road rail crossings and more are now being installed in Southern Rhodesia and the Northern Rhodesian Copperbelt. Automatic booms working in conjunction with the flashing lights have been installed at the busy Paisley Road crossing in Salisbury and in a period of nine months from opening have been smashed 24 times—but with no loss of life. Booms are also installed at Gatooma and a further installation is proposed for Nkana in Northern Rhodesia.

The principal sub-contractors for the supply of signalling, telephone and telecommunication equipment include the following:—

Carrier telephone/telegraph systems	General Electric Co. Ltd. Automatic Telephone & Electric Co. Ltd.
Automatic telephone exchanges	Automatic Telephone & Electric Co. Ltd.
Teleprinter equipment	Creed & Co. Ltd.
Selector telephones ...	Standard Telephones & Cables Limited
Switchboard & telephones ...	Ericsson Telephones Limited
Line material ...	Stewarts and Lloyds Limited, Rhodesian Cables Limited
Radio equipment ...	Pye Telecommunications Limited Philips Rhodesian Limited Radio Corporation of America Limited
Signalling equipment and c.t.c.	Associated Electrical Industries—G.R.S. Limited Siemens General Electric Signals Limited Westinghouse Brake & Signal Co. Ltd.
Axle counter equipment	Siemens & Halske Limited
Signalling cables ...	African Cables Limited British Insulated Callender's Cables Co. Ltd. Enfield Cables Limited Rhodesian Cables Limited Scottish Cables Limited



Control panel at Salisbury West Signalbox

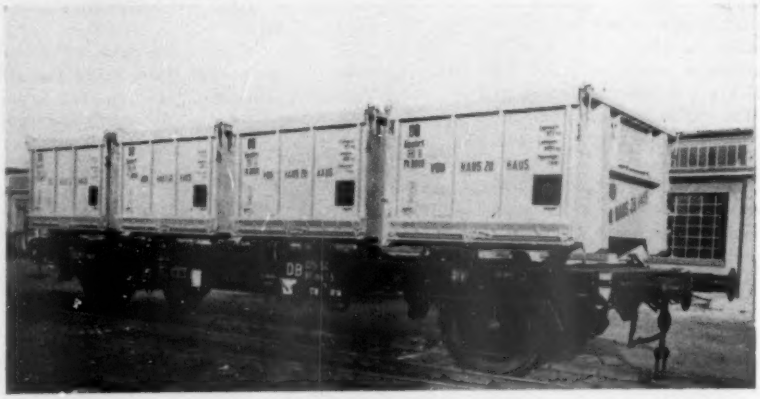
RAIL-CONTAINER TRAFFIC on German Federal Railway

Reduction of costs and quicker handling achieved by use of containers

More than three million small-wheeled containers were loaded on German railways in 1961 and German industry forwarded 3.5 million tons of freight in approximately 700,000 "PA" containers of 5-ton loading capacity.

the German Federal Railway handled 4·5 million tons of goods in containers last year. To make the handling of goods more successful by reducing the costs and duration of operations, many studies have been made by the system which is working more actively to develop facilities for forwarding goods in containers. These containers have a wide field of usefulness including transport of bulk products. They are designed to meet requirements for real interchangeability between different types of carriers, lower transfer costs, and reduced danger of loss, damage, and pilferage.

The sizes of small-wheel and large containers in use by German Federal Railway are shown in the following tables: —



"EOS" type open containers

Table 1—Small-wheeled containers

Type of Container	Capacity cu. metres	Inside measurements Length ft. in.	Width ft. in.	Height ft. in.	Overall outside dimensions Length ft. in.	Width ft. in.	Height ft. in.	Capacity tons
A	1	4 9	2 7	3 0	5 8	2 9	4 2	1
B	2	5 5	1 0	4 4	6 4	2 11	5 6	1
C	3	6 3	3 7	4 7	7 2	3 10	5 10	1

Table 2—"PA" containers ("pa" is an abbreviation of porteur aménagé)

Type of Container	Capacity cu. metres	Inside measurements Length ft. in.	Width ft. in.	Height ft. in.	Overall outside dimensions Length ft. in.	Width ft. in.	Height ft. in.	Capacity tons
E	12.1	9 7	7 0	6 5	10 2	7 6	7 10	5
Ef	7.5	9 7	6 5	6 5	10 2	7 0	7 0	5
Eos	7.6	9 10	11 0	4 8	10 2	7 0	6 6	5

E, closed container; Ef, closed container for loose goods in bulk; Eos, open container

While the railways continue to lose their battle with the roadhauliers on the grounds of both economics and service, increased use of containers will be necessary and become of greater importance than hitherto. The German Federal Railway, therefore, has taken steps to make this possible.

Use of "PA" roller-containers

The use of "PA" roller-containers in Germany dates back to 1950. These are available in three basic types (see Table 2) open, closed, and closed for loose goods such as grain, malt, gravel, sugar and cement in bulk.

Such containers are carried by rail on special two-axled "BT" wagons. Normally, a "BT" wagon will accommodate four or five "PA"-containers.

By road, a special type of lorry effects the transfer of containers between station and factory. The lorry has a tilting arrangement, which can be used to unload loose bulk goods without removing the container. Normally, the transfer from wagon to lorry and *vice versa* is effected by rollers; the containers may also be handled by crane. It is true to say that these containers provide a complete and universal service to the customer without expensive local equipment.

Present containers can be transported on special "BT" wagons and on specially-equipped wagons which are available in Germany, Belgium, the Netherlands, Sweden, and Switzerland.

Certain fundamental facts have contributed to this container traffic: it provides a complete and widely useful consignor-consignee service; it involves the smallest possible number of container types; and rail/road transfer is a fast, easy, one-man operation.

In Germany, approximately 90,000 small-wheeled containers serve today for consignments of less than full wagon loads.

Container exchange facilitated

Because "PA" containers can be handled by crane and according to the agreement between the European Railways laid down in the R.I.V. (International Regulations governing the exchange of wagons and containers) consignments between Germany and the whole of Europe—with the exception of Spain, Portugal, Russia, and Finland—can now be effected in those containers. That such problems can be successfully solved seems to be demonstrated by the 19,000 "PA" containers already in use in Germany. The performance of this stock increases continuously year by year as shown in Table 3.

Table 3

Year ending	Railway-owned "PA"-containers	Total goods carried tons	Number of container journeys	Percentage increase
1955	7,252	1,240,600	240,317	—
1956	11,054	1,721,600	344,045	+38.7
1957	15,358	2,346,600	467,895	+36·3
1958	16,311	2,384,200	481,663	+ 2·9
1959	16,314	3,167,200	639,977	+32·9
1960	18,759	3,388,900	695,039	+ 8·6

The carriage of as much as 15 per cent of this traffic is performed in containers. Primarily, these are consignments of expensive and valuable consumer goods.

Wheel containers in use on the German Federal Railway

Table 4 illustrates the development in the number of small-wheeled containers owned by the German Federal Railway and the annual use from 1950 to 1960.

Table 4

Year ending	Railway owned containers	Number of container journeys	Percentage increase
1950	33,655	1,092,274	—
1951	38,655	1,438,745	+31.7
1952	40,797	1,518,458	+ 5.5
1953	44,462	1,701,398	+12.0
1954	49,736	1,881,033	+10.6
1955	61,753	2,168,631	+15.3
1956	77,147	2,482,023	+14.4
1957	79,423	2,685,611	+ 8.2
1958	81,963	2,788,767	+ 3.3
1959	81,766	2,914,867	+ 4.5
1960	84,932	3,084,422	+ 5.8

The average weight of each consignment amounted to 322 kg. (about 6 cwt.) and the average length of haul 240 km. (150 miles). About 9 per cent of containers used are forwarded from Germany to other Continental countries and to Great Britain. The important advantages of saving packing costs and customs charges by shipping in containers is responsible for German industry requesting the use of these small-wheeled containers all the year round.

The German Federal Railway owns some special " BT " wagons for the use *via* the Zeebrugge-Harwich ferry-boat service. Three containers are carried on this wagon and its total loading capacity is 15 tons. The " BT " wagon can be loaded with closed or open " PA " containers, depending on the kind of goods. For traffic with Great Britain the containers are loaded in the direction of travel instead of across the wagon. For the purpose of loading and unloading in Great Britain the wagons are fitted with three turn-tables upon which rest the guide rails of the containers. The turn-tables are operated by hand. This service allows containers to be placed at a firm's premises either by road or rail. If greater interest could be created in the use of such wagons, both in Great Britain and in Germany, the German Federal Railway would probably be inclined to add to the existing small number of wagons at present available. " BT " wagons are designed for rail speeds up to more than 80 km.per.hr. to operate the wagons in fast-running goods trains, such as T.E.E.M.—(Trans-European-Express Merchandise) trains which have been running since June, 1961, and carry mainly highly-tariffed and perishable goods. Advertising of a direct and economical " PA" container service between Great Britain and Germany might therefore be initiated in view of the changes in the economic climate which might eventually be brought about by the Common Market.

Table 5 gives an idea of the European use of containers according to the U.I.C. statistics for 1959. As far as Germany is concerned 8·9 per cent of small-wheeled container movements and 1·6 per cent of large container movements were in Inter-European transports, including Great Britain. Such an international service on the basis of standardised dimensions of containers are important in the Inter-European co-ordination of goods traffic.

" EF" type closed containers for loose goods in bulk

TABLE 5—CONTAINERS (U.I.C. Statistics, 1959)

From	Number at the end of the year						Traffic			
	Railway owned containers			Privately owned containers			Number of journeys		Goods carried	
	Normal	" PA "-containers	Small wheeled containers	Normal	" PA "-containers	Small-wheeled containers	Large containers	Small containers	Large containers tons	Small containers tons
Germany	41	16,314	81,767	53	799	1,305	649,619	2,919,002	3,209,118	939,919
Austria	—	—	3,041	3	—	—	161	89,876	1,365	40,672
Belgium	—	1,224	1,960	1,184	—	—	28,410	39,269	133,500	17,671
Denmark	—	—	1,555	5	—	6	—	55,981	—	—
Spain	—	—	—	1,992	—	—	—	—	—	—
Finland	—	—	517	—	—	—	—	—	—	—
France	15,000	—	8,900	31,300	—	19,700	—	253,000	—	2,022,000
Great Britain	38,132	—	11,719	—	—	—	—	—	—	—
Italy	50	—	1,660	756	—	3,385	166 *	12,240 *	325 *	2,995 *
Norway	8	—	693	—	—	18	—	—	—	—
Netherlands	—	2,487	476	—	12	—	—	—	—	—
Poland	—	—	6,577	—	—	—	—	207,912	—	125,452
Sweden	—	246	8,090	—	—	573	4,610	185,275	20,360	—
Switzerland	275	312	2,929	237	2	2,378	25,900	—	153,506	—

* Excludes private containers

SOIL-TESTING LABORATORY at York

Extension of facilities on the North Eastern Region of British Railways

THE North Eastern Region of British Railways has recently opened a large extension to its soil-testing laboratory at Leeman Road, York. This adjoins the main building of the newly-completed concrete depot, and follows the introduction last year of a mobile soil-testing laboratory, the first of its kind to operate on British Railways.

Setting up consolidation machine before making tests

Soil testing plays an important part in the selection of foundations necessary to support buildings and bridges. In these days, building sites are often determined more by availability than choice, and so that full use can be made of the ground available, present-day building tends to be higher than in the past. Because of this, more weight is placed on each square foot of the foundations than in former days, and it is vitally important to calculate any settlement likely to occur on the site and take steps to avoid it. A careful study of the ground often enables building to be carried out on sites which are so poor that they would otherwise be derelict. Problems arising from soil slips in embankments and cuttings often face railway engineers, and effective remedies can result from the study of the composition of the soil from the site.

Borings are made or trial pits are dug from which undisturbed samples of soil are taken and despatched in metal cylinders to the soil-testing laboratory. Here the samples are tested for particle size, water permeability, and any characteristics which may affect the subsequent building construction on the site or the making up of the cutting or embankment.

Soil testing proved its value and saved British Railways money in the construction of the concrete depot at York. The site was on alluvial soil and 50-ft. piles would have been needed to make a firm foundation for the main building. Filling material from a site at Poppleton, near York, was tested and it was found that, with a suitable degree of compaction, this material would provide a good foundation without resorting to expensive piling.

Measuring equipment

The soil-testing laboratory has a full range of modern testing equipment. One machine measures the consolidation characteristics of various types of soil, another machine finds the different grading of soil particles by means of graduated sieves, and still another determines the degree of water permeability of soil.

Some of the testing machines serve a dual purpose, as they are also used by the adjacent concrete depot for testing cement mixes and aggregates, and for crushing tests to determine the strength of batches of concrete.

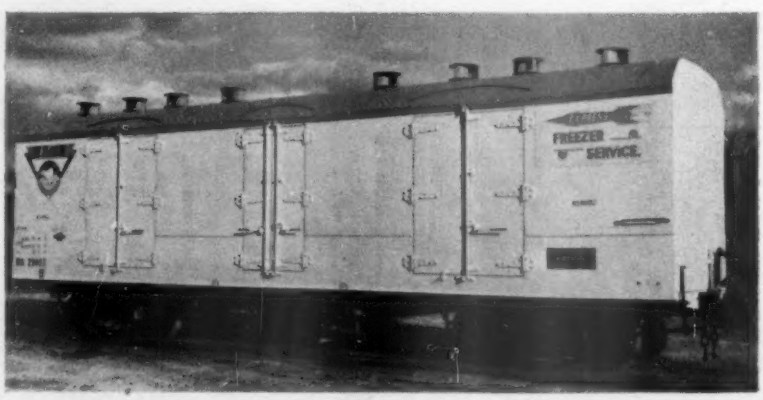
FREEZER VAN MOTIFS FOR W.A.G.R.

Designs not only decorate but identify refrigerated and freezer vans in Western Australia

MOTIFS depicting a polar bear and a rocket are being used on large "freezer" vans on the Western Australian Government Railways to feature its refrigerated and freezer services.

A total of 21 of these vans are in service and have proved ideal for the transport of meat, milk, fruit, frozen foods, and other perishable commodities. They have a tare of 22 ton 18 cwt., a carrying capacity on heavy lines of 31 ton 12 cwt., and a cubic capacity of 1,500 cu. ft.; there are two ice compartments 15 ft. 8 in. x 7 ft. 5 in.

The vehicles are insulated with "Onazate," and have light control bogies with 24 ft. centres. The height to roof from rail level is 12 ft. loaded, and the total length on draw gear is 39 ft. 8½ in. Each loading section has 105 hooks 5 ft. 10 in. from floor level.



Freezer van in use on Western Australian Government Railways

ELECTRIC RAILWAY TRACTION SECTION

Electric traction in perspective

DURING the long supremacy of the steam locomotive, engineers responsible for its development were working in a field which barely touched that of industrial power. The electric traction engineer of today, on the other hand, comes under searching scrutiny from his brethren in other branches of the electrical profession and lives in a society whose attitude towards eminence tends to be suspicious and aggressive rather than deferential. There seems little chance for him of a pedestal in his lifetime and an aftermath of kindly legend in which such mistakes as he may have made will be embalmed as picturesque foibles, like that of Dr. Johnson of touching alternate posts as he walked down Fleet Street. Instead of this he must be constantly in the arena, upholding his beliefs by exposition and argument whenever the opportunity occurs. Indeed, it is necessary for the prestige of the railway profession as a whole that those engaged in other technical pursuits should know what its engineers are doing and see the present state of electric traction in its true perspective relative to other technologies. One method of accomplishing this is through the medium of the journals of institutions, and an example of the kind of material which carries weight is an article by Mr. J. A. Broughall, Assistant Chief Electrical Engineer, British Transport Commission, in the November issue of the *Journal of the Institution of Electrical Engineers*.

As a concrete example of technical and economic trends since the 1914-18 war as they have affected electric traction, Mr. Broughall contrasted a locomotive built about 1914 with one of the present "3056" series for British Railways 25-kV a.c. electrification. The older locomotive, details of which conform with the Newport-Shildon Bo-Bo class of the North Eastern Railway, weighed 74 tons, had a maximum tractive effort of 28,000 lb., a continuous power of 1,100 h.p., and cost about £5,500. The present design weighs 79 tons, has a maximum tractive effort of 48,000 lb. (about twice that of the earlier one) and a continuous power of 3,200 h.p., or three times the other. Unfortunately, it costs over £70,000, or about 12 times the price of the 1914 locomotive. But although this modern locomotive has semi-conductor rectifiers of germanium or silicon, Mr. Broughall acknowledged that it is "already out of date," for trials began this autumn of a locomotive with transductor-controlled acceleration, and this in turn is expected to be the harbinger of a future when solid-state devices will be used to control power and speed. Mr. Broughall foresaw that new electronic techniques, already being applied experimentally, might supersede electro-pneumatic contactors, and thought that even the well-tried d.c. motor was unlikely to be immune from the effects of such developments.

In general terms, Mr. Broughall expected fundamental changes in control systems as more was learned about how to control the electrons which constitute an electric current without recourse to moving contacts. This line of investigation, it may be recalled, was referred to in the paper on "Research for a.c. traction" read by Dr. F. T. Barwell at the British Railways Electrification Conference last year. The paper showed how controlling the main motor currents by means of very weak signals would bring advantages in simplifying anti-slip control, and in enabling very heavy overloads to be applied for short periods under the automatic supervision of temperature-sensitive devices embedded in critical parts of the equipment. Such methods of controlling high powers by means of low-current signals are akin to the servo-systems so widely used in other branches of electrical engineering. It was also stated at the conference that a prototype equipment had been tested in which rectifier switching during tap-changing relieved the tapping contactors of arc-rupturing duty, thereby reducing wear and maintenance, and eliminating tap-changing reactors, so improving the power factor during notching. The number of solutions to long-standing problems now becoming available in itself introduces further complications for those who must map the course to follow. One method may have advantages on the test bed while another seems likely to score in day-to-day service. Yet the less sophisticated approach carries the risk of being rapidly outmoded. Every engineer will appreciate these problems. One factor which will help in the making of decisions in future is brought out by Mr. Broughall in his article. It is that the growing facilities on British Railways for service trials of a.c. equipment will now avoid the need to bring new equipment into intensive service after relatively restricted tests on steam timings, as had to be done in the Glasgow, London, and Manchester areas in 1960.

A.C. motors for suburban stock?

AFTER its eclipse by rectifier traction, it is particularly surprising to see the 50-cycle a.c. series motor reappear in prototype stock for services with frequent stops and re-starts. Even when this machine was at its previous peak of development, such duties were generally considered the least suitable for it. A three-car set with a.c. motor drive is one of four prototype suburban trains for the 25-kV. 50-cycle system which have been undergoing trials on the French National Railways. All these sets consist of a motor coach and two trailers, the motor coaches being powered by one single-motor bogie producing about 900 h.p. Three sets have silicon rectifiers and one d.c. motor; the fourth has an a.c. motor controlled through a continuously-variable Pruneau transformer. This motor is a force-ventilated, 20-pole machine taking 2,750A. at 320V. for a continuous output of 930 h.p., and weighing 5,300 k.g. Starting current is 4,500A. The armature winding includes resistive connections, and interpole shunts consisting of resistances and capacitances are used to improve the commutation at different speeds. In general, therefore, the motor follows the best practice established up to the time that interest shifted to rectifier systems, and it will be interesting to learn how its performance has compared with the d.c. machines in the other sets. These develop 940 h.p. continuously on 850V., 870A., take a starting current of 1,150A. and weigh 4,150 kg. All the figures seem to be in their favour, and the a.c. machine will have to produce a significant and unforeseen practical advantage to justify its greater weight and current demand. It may be noted, however, that there is no conventional tap-changing with the Pruneau transformer, whereas the rectifier sets use a normal low-tension tap-changer. A drift back to a.c. motors would be surprising, but perhaps no more so than the revolution which has taken place since 50-cycle traction was first put forward as a system for secondary lines of light traffic which could not be electrified economically by other means. It is well known that a considerable body of opinion considers that the system will not become generally acceptable until it can dispense with rectifiers.

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ERECTION OF OVERHEAD EQUIPMENT in tunnels in India

Procedures for providing clearance on 25-kV. sections of the Eastern Railway of India

THREE tunnels between Gujandhi and Gurpa on the Gomoh-Gaya section of the Eastern Railway of India involved some special design work to allow the installation of overhead equipment for 25-kV. electric traction. The tunnels are respectively 237 metres, 191 metres, and 107 metres long, and carry two broad-gauge tracks with curvature of 3 deg. Vertical oscillation of pantographs in tunnels is restricted to 50 mm. by the design of the overhead equipment, and horizontal oscillation, with maximum track superelevation of 110 mm. and a contact wire height of 4·65 metres was calculated as 255 mm.

Calculating clearances

After preparation of the clearance diagrams, cross sections were taken of the tunnel profile at intervals of approximately 8 metres for comparison, and intermediate clearances were plotted by interpolation. To find if extra clearance would be necessary at points where overhead equipment supports were to be installed, cross-sections were taken at these locations. On these the positions of the catenary and contact wire were first plotted, and then the brackets and supports were drawn in. From the extremities of the live parts of the equipment, circles of 320 mm. radius were drawn, showing where they intersected the tunnel profile that more clearance was necessary, and to what extent.

In these three tunnels local conditions made lowering or slewing of the tracks impracticable, and so the tunnel profile had to be widened at places where extra clearance was necessary. This involved chiselling out the rock at various places along the tunnel for clearance from the moving pantograph, and cutting niches opposite the ends of the catenary registration arms. These niches were 2 metres long in the direction parallel to the track, 80 cm. wide, and of various depths according to the extra clearance which had to be provided.

Suspension structure

The suspension structure for each overhead line support was a vertical framework consisting of two channels and two crossbars, hanging vertically at 1,160-mm. centres from baseplates secured by $1\frac{1}{8}$-in. dia. Lewis bolts embedded 40 cm. into the tunnel masonry or rock. Insulators for the catenary were mounted on the two crossbars of each framework. The frameworks themselves were installed in pairs "in tandem," at 3·1-metre spacing, each carrying the cantilever for the catenary of one track. The cantilever construction is shown in the accompanying drawing, together with a sketch plan of the layout of the two frameworks forming a pair. Additional bolts in sets of four were provided between the two frameworks of each pair to form emergency suspension points for a bracket in case of damage. Spacing between consecutive pairs of frameworks is 36 metres.

The area containing the tunnels is devoid of communications apart from the railway, uninhabited, and covered by deep jungle. It was therefore decided to equip a materials train as a complete mobile working unit. The formation consisted of 14 vehicles, including two tools vans, a generator van for power supplies, and two flat wagons carrying compressors and a welding generator.

Rotating platform

Two flat wagons carried steel stagings from which most of the work was carried out with pneumatic tools. To reach the apex of the tunnel vault, each staging supported a rotatable platform which during travel to site was fixed with its axis in line with the wagon so as to be within the loading gauge, but which during work could be swung through 90 deg. and then extended further into the six-foot way. To give additional height where necessary, the soffit being 25 ft. above rail level in some places, an auxiliary staging could be rapidly assembled and mounted on the platform. The whole operation of rotating the platform inside the tunnel and erecting the auxiliary staging on it took about five minutes from the time the train stopped at the scene of work.

As consecutive suspension structures forming a pair were at a constant spacing of 3·1 metres, two stagings were fitted on each flat wagon at this distance apart. Consecutive locations (each with two suspension structures in "tandem") were 36 metres apart, and the flat wagons were marshalled in the train at the same spacing, being separated by a "dummy" wagon included for spacing purposes alone. Thus it was possible to drill the holes for four suspension structures simultaneously. Two of the three compressors in the train were in operation at a time, the third being a standby. A wagon carrying a clearance profile was marshalled between one of the staging wagons and the pair of wagons carrying the compressors to minimise inconvenience to the working parties from the exhaust gases, and flexible piping was laid along the train to convey compressed air to the stagings. Lighting was supplied from a 5-kW. generator in the power van by cables running through the train.

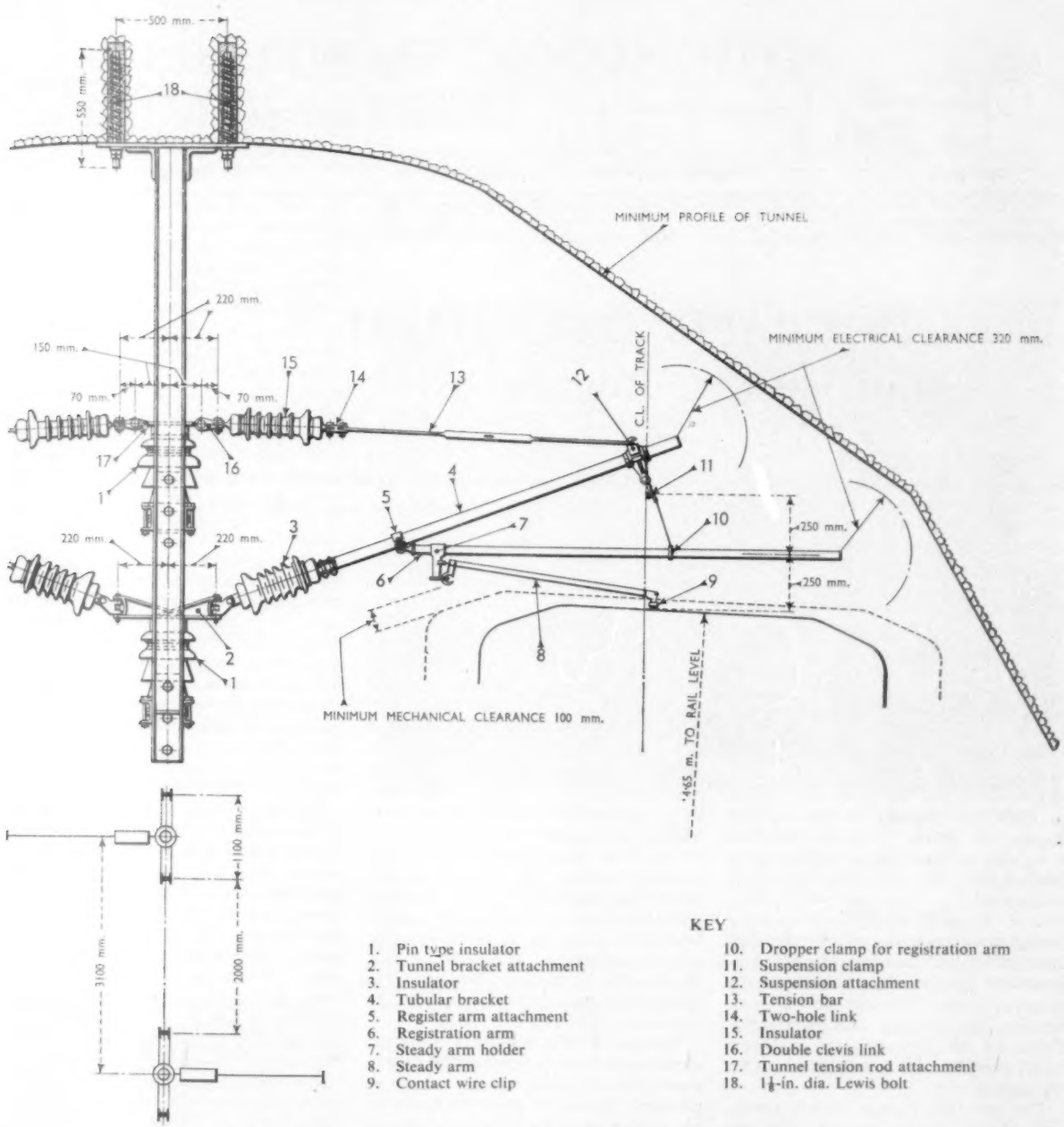
Checking clearances

Removal of rock to obtain clearance for the pantograph inside the tunnels was effected in the main by pneumatic chisels, but preliminary drillings were made and the chisels used to remove the rock between these holes. To ensure that sufficient rock had been removed, the tunnel section was checked with a timber profile which, accurately reproducing the clearance diagram, was mounted on a flat wagon and drawn slowly through the tunnel by the materials train. The extremities of the profile were made collapsible on vertical and horizontal hinges to prevent it being damaged if sufficient clearance had not been obtained. For frequent checks during the work a portable gauge was made which could be fixed on the track. This was not a complete profile but simulated only the critical parts.

Holes for the Lewis bolts were made easily and quickly in brickwork, but where rock had to be dealt with the procedure was first to drill with a $1\frac{1}{2}$-in. bit, then widen the hole with a $2\frac{1}{2}$-in. bit, and finally to taper it to 4 in.

Grouting the holes

For grouting the holes in position, a mortar injector was manufactured consisting of a 2-ft. cylindrical tube, 3 in. in diameter, with a plunger working in it. The tube was filled with a rich mix of quick-setting cement mortar. After moistening the surface of the hole with water, the mortar was injected into the hole until it was completely filled. After the bolt had been gently screwed in to the required depth, it was held tightly in position by means of two small wooden wedges at the free end of the hole. A stiff mixture of fine stone chips and rich cement mortar was then packed through the annular space between the



KEY

1. Pin type insulator
2. Tunnel bracket attachment
3. Insulator
4. Tubular bracket
5. Register arm attachment
6. Registration arm
7. Steady arm holder
8. Steady arm
9. Contact wire clip
10. Dropper clamp for registration arm
11. Suspension clamp
12. Suspension attachment
13. Tension bar
14. Two-hole link
15. Insulator
16. Double clevis link
17. Tunnel tension rod attachment
18. 1⅛-in. dia. Lewis bolt

Suspension of catenary supports from tunnel vault (dimensions in millimetres)

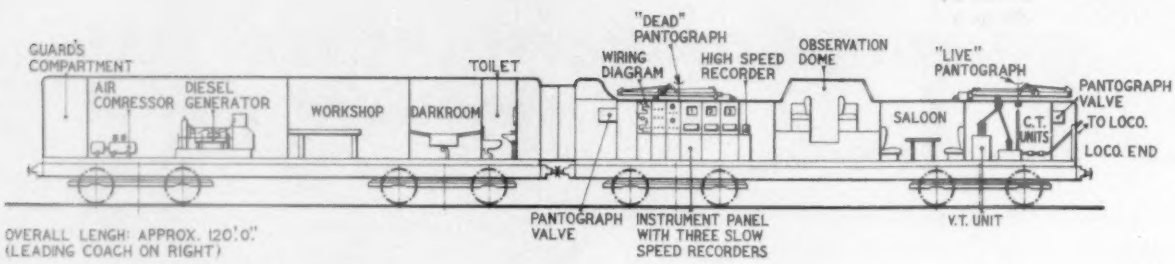
bolt and the hole by means of wooden pokers. This was continued until there was no further entry of the mix, which indicated that the hole had been filled compact.

Maintenance of the correct super-elevation is essential in these tunnels to preserve the prescribed clearances. To assist the staff, markers have been fixed at intervals of 50 ft. They are in the form of angle-iron pieces, one leg of which indicates the rail level, and are grouted into the tunnel rock or masonry, projecting 3 in. from the tunnel face.

FIRST ELECTRIC LOCOMOTIVE FROM CHITTARANJAN

On October 14, the Indian Prime Minister, Mr. Nehru, inaugurated at Chittaranjan Locomotive Works the first electric locomotive to be built there, or elsewhere in India. It is to be noted that this and its sister engines are d.c. and not a.c. locomotives, presumably for use in the Calcutta or Bombay areas where all electrification at present in service is d.c. It is understood that Indian Railways are to construct 72 of these d.c. locomotives annually under the Third Five-year Plan.

The design is by Indian engineers and the whole of the mechanical parts are Indian-fabricated. Only the electric components have had to be imported, and it is hoped that they also will be Indian-built as soon as Heavy Electricals Limited, of Bhopal, gets into full production.



PANTOGRAPH TEST COACH in the Eastern Region

Further details on equipment designed in conjunction with British Railways and described in an earlier issue

FURTHER details are now to hand of the overhead equipment test unit which has resulted from collaboration between the research organisation of British Insulated Callender's Cables Limited and engineers of the Eastern Region of British Railways. This equipment was briefly described and illustrated in our issue of November 17 last.

As stated in that article, the purpose of the equipment is to ensure that the initial high standard of current collection is maintained in service. Developed jointly by the Instrumentation & Control Department of the B.I.C.C. Research Organisation and the Chief Mechanical & Electrical Engineer of the Eastern Region of British Railways, the unit is capable of travelling at speeds up to 100 m.p.h.

The test train

The unit comprises an instrumented coach fitted with two pantographs, and generator coach which provides the electrical power for the instruments, lighting, and heating. An electrically-driven air compressor in the generator coach provides the air supply for raising the pantographs.

The instrument coach, or test coach, was converted at the Doncaster Carriage Works from a normal passenger vehicle, so as to have a central observation dome and flat roofs at each end, both of which were fitted with Stone Faiveley type A.M.B.R. pantographs. Close liaison was maintained throughout the conversion period to ensure that the internal coach layout, cabling ducts, power points, lighting points, airlines, roof and floor cut-outs, high voltage bushings, etc., were positioned to facilitate the subsequent installation of the instrument panel and associated equipment.

The instrumentation of the coach was carried out in a siding adjacent to the B.I.C.C. Research Laboratories at Wood Lane, London. The majority of the instruments are contained in an instrument panel, 12 ft. long x 18 in. wide x 6 ft. high, which is secured to both the coach floor and roof by anti-vibration mountings. The panel is mounted below a pantograph which is earthed to the coach and is designated the " dead " pantograph. This " dead " pantograph is used during tests when the overhead line is earthed and the test unit is being hauled by a diesel locomotive. At the opposite end of the coach is a high-voltage enclosure which is situated below a " live " pantograph insulated for 25 kV. This is used during tests with the overhead line live and with a diesel or electric locomotive hauling the unit. Arrangements have been made so that the electric locomotive can draw its power from the " live " pantograph on the Test Coach so that the overhead equipment is not disturbed mechanically other than by the measuring pantograph.

The quantities which can be measured and recorded are: pantograph height; acceleration; contact loss; contact pressure (" dead " pantograph only); locomotive current (" live " pantograph only), and train speed. In addition, track marks and timing marks can be inserted on all recordings. The selection for recording of any combination of measured quantities is effected by the use of jacks and sockets on a distribution panel on the console.

Recording facilities

The recording facilities comprise one four-channel " high-speed " recorder and three two-channel plus event mark " low-speed " recorders. The former has a good frequency response up to 1,000 cycles and the latter up to 25 cycles. All recorder charts are driven by stepping motors controlled by a stepping switch transmitter attached to a velodyne unit which receives its control signal from a tachogenerator attached to a coach axle. The chart speeds are therefore proportional to the train speed and the recordings are made on distance basis. A track distance of 100 ft. is equivalent to chart lengths of 20 cm. and 1 in. on the high speed and low speed recorders respectively.

Measuring equipment

Pantograph height is measured directly by a specially-designed linear potentiometer, some 7 ft. long driven by a light-weight glass-fibre tube attached to the pantograph-head. Strain-gauge accelerometers attached to the height gauges measure the pantograph-head accelerations. Contact pressure is measured by two strain-gauge ring dynamometers fitted into the pantograph-head, one at each side, the outputs being added to give the total force on the head. When running with the overhead line live, the line voltage is measured by an instrument transformer and displayed on a meter and recorded so that loss of electrical contact can be easily seen.

Dead line running

In the case of dead line running, a 300-V. d.c. circuit is completed *via* the pantograph, the overhead line and earth. Loss of contact is measured by recording the voltage swing in a section of the circuit. Track marks can be inserted on all recordings either manually or automatically. A lamp and photo-cell unit, mounted under the coach floor and vertically below the pantograph, is arranged to operate the track mark unit from a piece of aluminium foil placed on the track. Manual insertion of track marks can be made by pressing buttons in the obser-

Continued on page 690

LARGE ELECTRIC LOCOMOTIVES in the Soviet Union

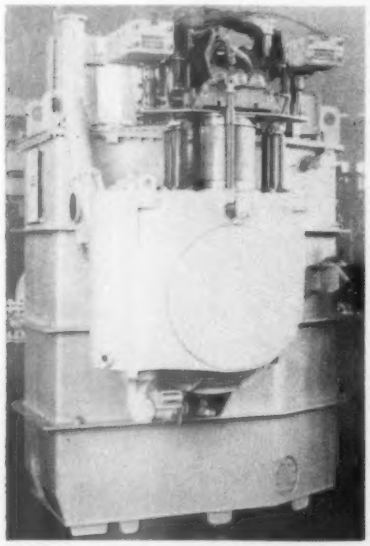
German-built industrial-frequency single-phase silicon-rectifier locomotives of 6,700 h.p. for operation in intense cold

AFTER three months' running trials of the first locomotive on standard-gauge bogies and with European standard side buffers and central drawhook, a batch of 20 large single-phase 50-cycle 25-kV. electric locomotives have been shipped from Germany to the U.S.S.R. for freight service along one of the eastern sections of the Trans-Siberian railway. The climatic characteristics of this railway led to a stringent specification that the locomotives would operate satisfactorily throughout a temperature range from 40 deg. C. to −50 deg. C. Though provision can be made with reasonable convenience for temperatures as low as −40 deg. C., the extra 10 deg. to −50 deg. C. forms a critical belt requiring a much deeper study of materials and careful attention to operating instructions.

Locomotive on test in Germany with side buffers and central drawhook in place of U.S.S.R. centre coupler

Oil-cooled transformer

Built by Siemens-Schuckertwerke and the Fried Krupp Maschinenfabriken, these Co-Co 5-ft. gauge 138-*tonne* locomotives have the feature of one main oil-cooled transformer feeding six nose-suspended traction motors through six silicon rectifiers. Each force-ventilated traction motor has a one-hour rating of 825 kW. and drives the 47·5-in. dia. wheel pair attached to it through 18: 74 single-reduction gears, but with a set of these gears on each side of the motor, a practice common in the U.S.S.R. as the extra 3½ in. of gauge width just allows this. Top speed is 62 m.p.h. and continuous wheel-rim tractive effort is 72,500 lb. at 30·5 m.p.h., and one-hour effort 83,500 lb. at 29 m.p.h. Because of the steep rate of rise in the tractive-effort curve below 30/33 m.p.h. 39 tap-changing steps have been embodied in the transformer control to give fine regulation.

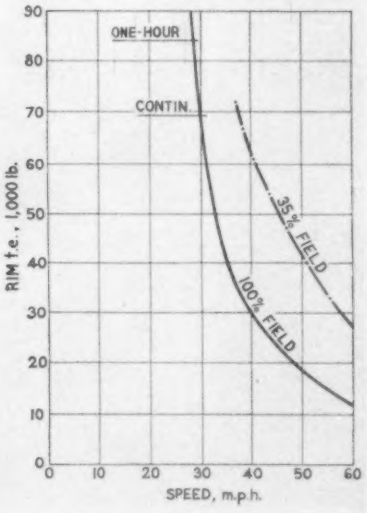


5,970-kVA. oil-cooled main transformer

Traction motors

The 5,970 kVA. main oil-cooled transformer is located in the centre of the locomotive body, with the oil-cooler and its fan some little distance from the main machine, and balanced diagonally as a weight by a motor-driven air-compressor set. Above each traction motor is a vertical group comprising the silicon rectifier for that motor, surmounted by the motor-driven force-ventilation fan, the air from which flows over the rectifier before going through bellows to the traction motor. The smoothing coil for each rectifier is alongside. From the main transformer all six traction motors are thus supplied in parallel, and the highest tension on the secondary side of the transformer, with 25kV. on the primary side, is 6 x 1,390V.

Each traction motor has a continuous rating of 725kW., with 48 per cent of full field and a current of 685A., and a one-hour rating of 825 kW. with 46·7 per cent of full field and a corresponding current of 785A.; maximum tension through a motor is 1,110V. and top speed is 1,810 r.p.m. These ratings are with cooling air at a temperature of 40 deg. C.



Speed/tractive effort curve

at the inlet; at the bellows the cooling-air stream divides into two, one stream flowing over the commutator end and the other entering at the fan end.

Dynamic braking is embodied, and the two resistance banks are located in the upper part of the body, just below the roof, and sit above the casings of the resistance-cooling fans. The resistances are of a special high-strength chrome-nickel steel; and each dynamic brake group has a capacity of 1,000 kW.

Silicon rectifiers

Two separate silicon rectifiers of 300 kW. total-capacity feed with 220-V. direct current, the six motors for the traction-motor blowers, the motors of the oil-cooler fans, the brake-grid cooling-fan motors, and the motor-driven air-compressor groups. This independent auxiliary power supply gives the possibility of all these fans being run at reduced speed in winter. The 42-cell nickel-cadmium battery is charged through a transductor-controlled silicon charging rectifier.

The pantographs are of lightweight form with only two lower legs but with four arms in the upper portion; the joints have needle roller bearings lubricated by an anti-freeze synthetic grease. The operating air cylinders are located within the roof structure to keep them away from the intense cold of winter. In the summer the ventilating air of the traction motors is passed straight to atmosphere, but in winter the warmed air coming out the traction motor is passed back into the large machinery room and finally escapes to atmosphere through the panel filters and grilled along the superstructure.

Leading dimensions

Leading dimensions of these locomotives are: wheel dia. 47·5 in., bogie wheelbase 16 ft. 3 in., bogie pivot pitch 38 ft. 6 in., length over frame 65 ft., width over side panels 10 ft. 2 in., height to roof plate 14 ft. 5 in., height over locked-down pantograph 16 ft. 3 in., service weight 138 *tonnes*, maximum axle load 23 *tonnes*, starting tractive effort at 30 per cent adhesion 91,000 lb.

Pantograph test coach in the Eastern Region

Concluded from page 688

vation dome or on the instrument panel. The traction current taken by the hauling electric locomotive is measured by a current transformer on the connecting cable between the locomotive and the test unit.

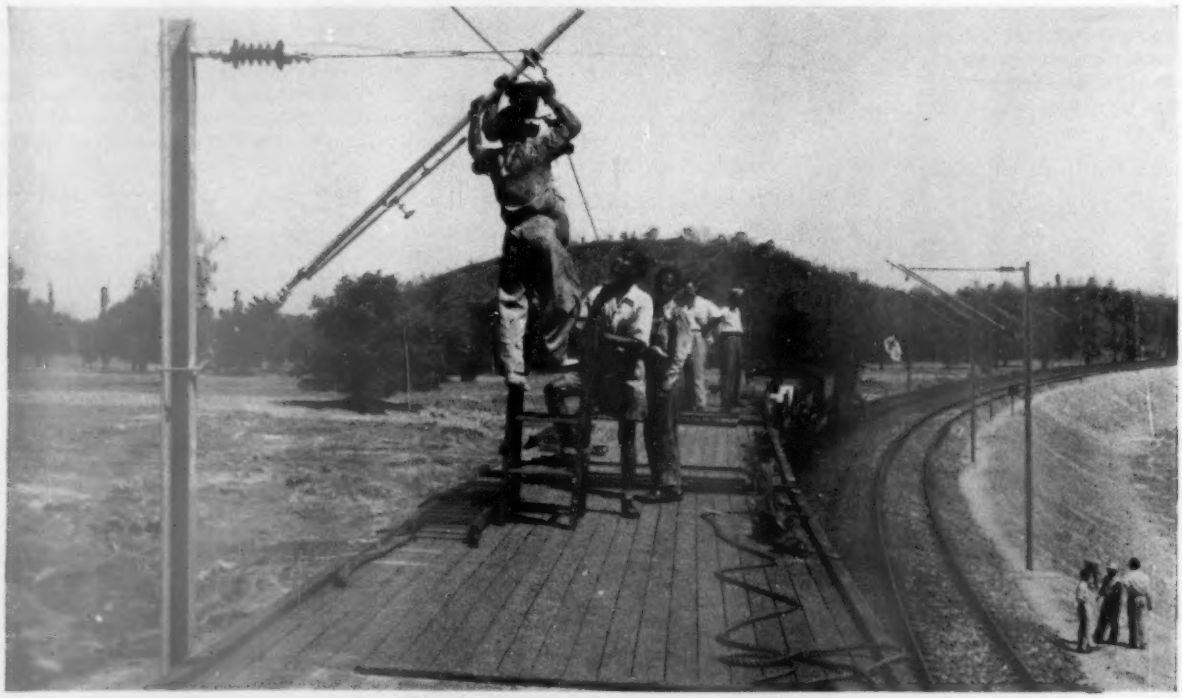
The test unit, which has recently gone into service, is similar in many respects to one developed earlier by B.I.C.C. for the Midland Region of British Railways. It will travel on all parts of the Eastern Region where lines are, or are being, electrified. Such lines include the Liverpool Street-Southend line, converted in 1960 from 1,500 V. d.c. to the British Railways standard high-voltage a.c. system.

Other uses

In addition, the apparatus will be used to test the overhead equipment on the North East London lines, also completed in 1960. A further important function of the new high-speed pantograph test unit is to check the overhead equipment on the Fenchurch Street-Shoeburyness line, and also to ensure that the equipment between Chelmsford and Colchester on the line between Liverpool Street-Clacton/Walton is entirely satisfactory when the new electrified service begins to operate.

This is the practical side to the work being carried out to ensure that overhead electrification in the Eastern Region is as near 100 per cent perfect as possible. On the theoretical side experiments in the mechanical problems of current collection at high speeds continue to be conducted with models at the B.I.C.C. Railway Traction Research Laboratory at Tolworth, where considerable progress has been made.

ELECTRIFICATION IN SOUTH EAST INDIA



Catenary wire being run out from flat-top wiring train, Tatanagar-Dongoaposi line

PERSONAL

British Transport Commission

The British Transport Commission announces that the following part-time Members of Area Boards have indicated that they wish to retire on the completion of their period of office on December 31:

Eastern Area Board
THE RT. HON. SIR HENRY WILLINK.

London Midland Area Board
COLONEL SIR BASIL MCFARLAND, BT.
THE RT. HON. LORD RUSHOLME.

Scottish Area Board
SIR JOHN DENHOLM.
MR. P. L. MELDRUM.

Southern Area Board
MR. H. L. ROY MATTHEWS.
MR. H. F. B. ILES.

Western Area Board
SIR JOHN CAREW POLE, BT.

Several of those leaving the area boards will continue to help the Commission in other directions. Sir Basil McFarland will remain a member of the County Donegal Railways Joint Committee; Lord Rusholme, a Director of Thos. Cook & Son Ltd., and a member of the Commission's Police Committee; Sir John Denholm will continue as a Director of David MacBrayne Limited, and Mr. H. L. Roy Matthews as Deputy Chairman of Railway Sites Limited and a member of the Commission's Property Committee.

The Commission also announces that MR. DAVID BLEE, General Manager of the London Midland Region of British Railways, has decided to retire from the Commission's service on December 31, 1961. In consequence of this, the Commission has approved the following appointments to take effect from January 1, 1962:

MR. H. C. JOHNSON, at present General Manager of the Eastern Region of British Railways, to succeed Mr. Blee as General Manager of the London Midland Region;

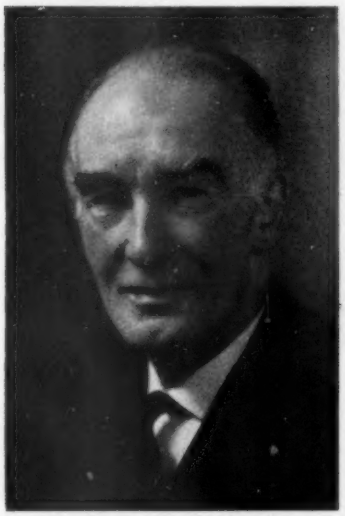
MR. J. R. HAMMOND, at present General Manager of the Western Region of British Railways, to succeed Mr. Johnson as General Manager of the Eastern Region;

MR. S. E. RAYMOND, at present Traffic Adviser at the Headquarters of the Commission, to succeed Mr. Hammond as General Manager of the Western Region.

On January 1, 1962, the General Manager of each of the Railway Regions will be appointed a Member of the appropriate Area Board.

As a first step toward building up a strong commercial organisation for British Railways, it has been decided to create a new post of Chief Commercial Officer at headquarters, to which the Commission has appointed MR. DAVID MCKENNA, at present Assistant General Manager of the Southern Region, also with effect from January 1, 1962.

With the appointment of a Chief Commercial Officer, the post of Traffic Adviser B.T.C. will be abolished. Railway commercial functions at this level will be the responsibility of Mr. McKenna, and operating functions will continue to be the responsibility of MR. G. F. FIENNES, recently appointed Chief Operating Officer, British Railways.



Mr. David Blee

MR. DAVID BLEE, C.B.E., General Manager, London Midland Region, British Railways, who is to retire on December 31, entered the service of the former Great Western Railway in 1916, and after holding various positions in the London, Exeter, Liverpool and Birmingham, and South Staffordshire Districts, was appointed Chief Goods Manager at Paddington in 1946. In October, 1947, Mr. David Blee was appointed a Member of the Railway Executive, on which he served throughout the existence of that organisation, with special responsibilities for the passenger and freight business of the railways, and for the Continental and overseas business. He has visited many railway installations on the Continent, in the United States, and in Canada. He has appeared as an expert witness on behalf of the Canadian railroads in the Supreme Court in Ottawa. In his capacity as General Manager of the London Midland Region he has seen the start of the electrification of the London, Manchester, Liverpool, and Birmingham trunk lines.

MR. J. V. SNOW, Commercial & Traffic Development Assistant, South Wales Docks, British Transport Docks, has been appointed Deputy Dock Manager, Newport.

MR. H. W. GATES, Assistant to the General Traffic Manager (Publicity, Public Relations & Sales Promotion), British & Irish Railways Inc., has been appointed Deputy Traffic Manager.

MR. A. T. ING, A.M.I.LOCO.E., Assistant to Motive Power Officer, Waterloo, British Railways, Southern Region, who, as recorded in our October 6 issue, has been appointed Motive Power Assistant to the Movement Officer, Waterloo, joined the Southern Railway as an apprentice at Ashford Works in 1942. He gained his first experience in the Motive Power Department at Dover motive power depot in 1948. In 1951 he became a Junior Assistant Foreman (Trainee) at Nine Elms motive power depot, where a year later he was appointed Foreman Fitter. He was appointed Shedmaster at Norwood motive power depot in 1955 and at Stewarts Lane motive power depot in 1958. He was appointed Assistant to Motive Power Officer, Waterloo, in 1960.

MR. H. C. JOHNSON, General Manager, British Railways, Eastern Region, who is to become General Manager of the London Midland Region on January 1, 1962, was educated at Bedford Modern School. He began his career with the former London & North Eastern Railway in 1923 as a Traffic Apprentice. In 1938 he was appointed Assistant District Superintendent, Cambridge. In January, 1940, he returned to London as Assistant to the Superintendent, Southern Area and in August, 1942, he became Assistant Superintendent, Southern Area, with chief responsibility for the Western Section, and in January, 1948, Operating Superintendent, Western Section, Eastern Region. During the last war he acted for a period as Railway Liaison Officer with Eastern Command on invasion preparations. He became Chief Operating Superintendent, Eastern Region, in January, 1955 and later in the same year he was appointed Assistant General Manager (Traffic). Mr. Johnson was appointed General Manager of the Eastern Region in 1958.

Mr. H. C. Johnson

MR. R. L. BROCK, Head of Section (Commercial Staff), Traffic Department, Waterloo, British Railways, Southern Region, who has been appointed Staff Assistant, South Western Division, joined the Southern Railway as a clerk at Wadebridge in 1923. After gaining experience at several stations and in

the District Superintendent's Office, Southampton, he was appointed to the Staff Section of the Commercial Superintendent's Office in 1948. He became Head of the Staff Section, Commercial Department in 1958 and Head of the Joint Operating & Commercial Staff Section in 1959.

MR. J. R. HAMMOND, M.B.E., B.SC.(ENG.), A.M.I.C.E., General Manager, British Railways, Western Region, who has been appointed General Manager, Eastern Region, joined the former Great Western Railway as a surveyor and draughtsman in 1937. He was for a time loaned to the Ministry of Aircraft Production. Mr. Hammond returned to the office of the Chief Engineer in February,

Mr. J. R. Hammond

1941. Mr. Hammond returned to the G.W.R. after war service in February, 1946, as Assistant in the Divisional Engineer's Office, Bristol. He was transferred to Neath, as Assistant Divisional Engineer, in 1947, and in 1948, moved to the Chief Engineer's Office at Paddington, as Personal Assistant to the Chief Engineer. Three years later he became Assistant District Engineer, Newport. In 1952 he was appointed District Engineer at Cardiff and transferred in 1953 to a similar position at Wolverhampton. In January, 1957, he was appointed Assistant to the General Manager (Modernisation) and a year later was re-designated Assistant General Manager (Modernisation). Mr. Hammond became General Manager in 1959.

MR. J. HEPBURN, Stationmaster, Milngavie, British Railways, Scottish Region, has been appointed Stationmaster, Bowling.

MR. S. E. RAYMOND, Traffic Adviser, British Transport Commission, who has been appointed General Manager, British Railways, Western Region, joined the London Passenger Transport Board in 1946, and after holding important appointments in staff management and administration with London Transport and British Road Services, was appointed in 1955 to the Headquarters of the British Transport Commission as Assistant Manpower Adviser. In

Mr. S. E. Raymond

1956 he became Director of Establishment & Staff, British Transport Commission, in 1957 he was appointed Chief Commercial Manager of the Scottish Region, and in 1959 he became Assistant General Manager (Traffic). Mr. Raymond was appointed Traffic Adviser, British Transport Commission earlier this year.

MR. W. J. KELLAND, Assistant for Rules and Regulations, Traffic Department, Waterloo, British Railways, Southern Region, who has been appointed Rules Assistant to the Movement Officer, Waterloo, joined the South Eastern & Chatham Railway in 1915, and after gaining experience at various stations was appointed to the District Superintendent's Office at London Bridge in 1916. He held various posts in the offices of the Chief Operating Superintendent at Waterloo and London West District Traffic Superintendent, mainly associated with rules and regulations and signalling work, and was appointed Assistant for Rules & Regulations at Waterloo in 1953.

MR. W. E. CHEESMAN, Head of Section (Operating Staff), Traffic Department, Waterloo, British Railways, Southern Region, who, as recorded in our October 6 issue, has been appointed Staff Assistant, Central Division, joined the railway in 1922 as a Junior Clerk at Waterloo, moving a few months later to Fulwell station. In 1924 he joined the Commercial Section of the London (West) Divisional Superintendent's Office and in 1933 he transferred to the staff section of that office. After several years experience of District Office staff work at Woking, Mr. Cheesman was appointed Head of Section in the District Traffic Superintendent's Office at Orpington in 1955. He took up a similar position when the South Eastern Division was formed some three years later and in December, 1958, he was promoted to Head of Staff Section (Operating) in the Traffic Department headquarters at Waterloo.

MR. B. SEYMOUR, Commercial Officer, British Railways, Southern Region, has been appointed a member of the Transport Users' Consultative Committee for the South Eastern Area until June 30, 1963, in place of MR. F. P. B. TAYLOR.

MR. DAVID MCKENNA, O.B.E., M.INST.T., British Railways, Southern Region, who has been appointed Chief Commercial Officer, British Transport Commission, joined London Transport in 1934. He was appointed an assistant in the office of the Vice-Chairman, the late Mr. Frank Pick, towards the end of 1936. On returning to London Transport after war service, he was appointed Development & Research Officer in 1946, Rolling Stock Superintendent (Railways) in 1948, and Commercial Manager at the end of 1950. When the Commercial Department and the Public Relations & Publicity Department

Mr. D. McKenna

were combined in 1953, he became Chief Commercial & Public Relations Officer. Mr. McKenna was appointed Assistant General Manager, Southern Region, in 1955.

MR. J. H. JOHNSON, Assistant in the Economic Survey Office, Euston, British Railways, London Midland Region, who, as recorded in our October 6 issue, has been appointed Finance Assistant, South Eastern Division, Southern Region, entered the service of the Southern Railway in 1935 in the Audit Accountant's Office. Mr. Johnson joined the Acquisitions Division of the British Transport Commission in 1949. He transferred to the B.T.C. Costings Division as an Assistant in 1955 and was appointed Assistant Traffic Costing Officer in 1957. In 1959 he was appointed Assistant in the Economic Survey Office of the General Manager's Office, London Midland Region, Euston.

Obituary

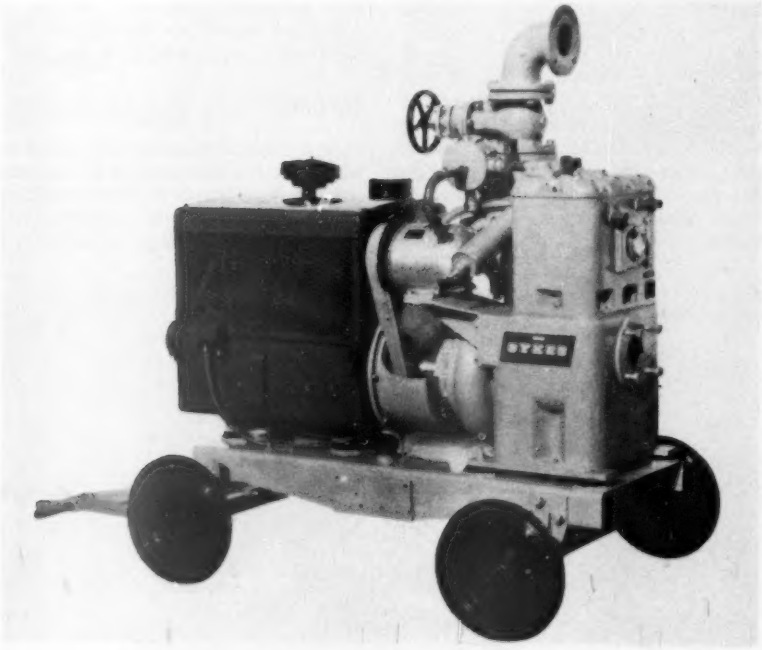
We regret to record the death, on December 7, at the age of 80, of MR. G. H. PARTRIDGE, who was, until his retirement in 1947, Chief Traffic Inspector, Great Western Railway. Mr. Partridge was responsible for Royal and V.I.P. journeys on the G.W.R. and made 77 journeys with members of the Royal Family.

NEW EQUIPMENT *and Processes*

CENTRIFUGAL PUMP

The Univac UVS4 4-in., self-priming, centrifugal pump has a self-priming time of 13 sec. at 10-ft. suction. Output at this lift is 27,900 gal.p.h. at nominal head. The pump is made to pass solids of up to 2¼ in. dia. as well as free-flowing slurries and abrasive sludges of up to 60 per cent solid content. At 28 ft. vertical suction lift, priming time is 58 sec. and output is 7,200 gal.p.h.

The pump is close-coupled to a Lister



SL3 air-cooled 3-cylinder diesel engine, developing 10·8 h.p. at 1,500 r.p.m. and 12·75 h.p. at 1,800 r.p.m.

The shaft between engine and pump is fitted with a renewable hardened sleeve where it passes through the flexibly-mounted packing gland. The gland is externally sealed by grease-impregnated packing and can be re-packed without dismantling the pump. The three-blade impellor is made of nodular cast iron and the wearing plates and casing are made of high-grade grey cast iron, avoiding the possiblity of electrolytic action if sea water is pumped. Special materials can be used where corrosion is a problem.

By separating the self-priming from the pumping duties in this pump, cavitation effects have been reduced to a minimum and high outputs are obtained on long suction lifts and with long suction pipes of up to 500 ft. The self-priming effect is achieved by a 22-cu. ft. per min. rotary vacuum pump vee-belt driven from the main shaft, with a primary float control tank and a secondary air-trap tank.

Further details can be obtained from Henry Sykes Limited, 53b, Southwark Street, London, S.E.1.

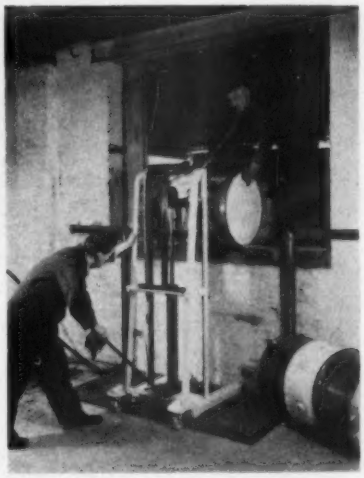
ILLUMINATED CEILING

The Luminated Westminster ceiling for workrooms and offices, described in our issue of July 15, 1960, has been adapted for use in large industrial situations. Known as the Hallmark ceiling in its adapted form, it incorporates a frame consisting of 14 gauge galvanised rolled-steel track of inverted " T " section with a corrugated web.

Further details can be obtained from Luminated Ceilings Limited, Alliance House, Caxton Street, London, S.W.1.

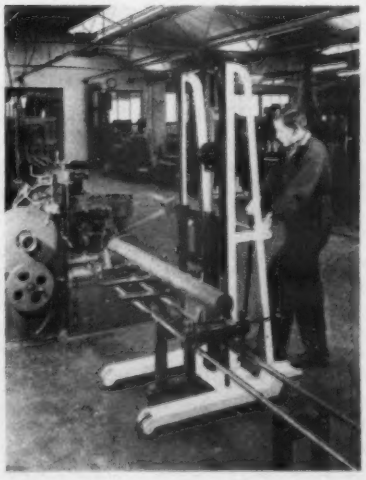
LIFTING TRUCK

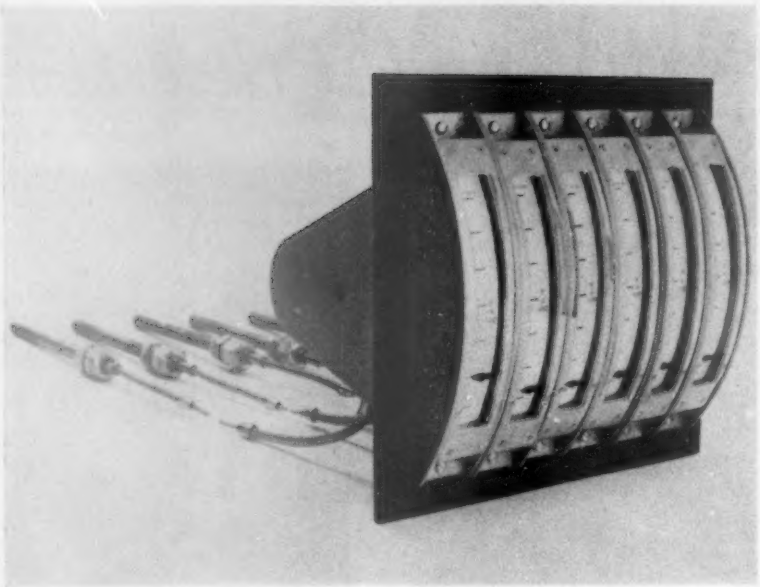
The Polymathic Coolie one-man-operated hydraulic-lift truck has a capacity loading of 10 cwt. and a maximum clearance height of 4 ft. 6 in. The base is 3 ft. 6 in. x 2 ft. 3¼ in., and the frame height is 6 ft. It is mounted on 4-in. dia. wheels with grease-packed bearings. Three attachments are available, fork-lift arms with 1 ft. 8 in. reach, a steel platform measuring 1 ft. 8 in. x 1 ft. 6 in., and a jib arm extending out 2 ft. 6 in. Because of overhang, the maximum load on the jib arm is limited to 3 cwt. The truck has exceptional stability and is easily manoeuvrable in confined spaces.



The self-contained hydraulic pump, designed by the manufacturer, is self-contained and has no external piping. Lifting is by hand lever and lowering by a foot-operated variable-speed release valve. A safety-valve protects the unit from overload. A range of alternative pumps, wheels and allied parts allows the truck to be adapted for various applications.

Further particulars can be obtained from the Polymathic Engineering Co., Ltd., Tamworth, Staffordshire.





GROUPED THERMOMETERS

Model 605 mercury-in-steel thermometers are 2 in. wide and 7½ in. long so that as many instruments as required can be placed side by side in a small space. A bank of six thermometers measures 9¾ in. deep x 11½ in. wide overall. In addition to the saving of space, the vertical scale, replacing the normal dial, allows comparative readings to be made at a glance.

The thermometers have a range from −30 deg. F., to +1,200 deg. F., or the Centigrade equivalent, this being within the limits of mercury. The scale has an unbreakable window surrounded by a chromium-plated flange. It is housed in a light-alloy casting. Zero adjustment is by an accessible screw. The capillary can be supplied up to 120 ft. long but is normally 10 ft. long. It is copper-sheathed with 6 in. of stainless-steel armoury at head and back.

Further details can be obtained from the British Rototherm Co. Ltd., Merton Abbey, London, S.W.19.

HYDRAULIC MOBILE CRANE

The Tunny mobile crane is based on the Fordson Super Major tractor unit, which develops 51·8 b.h.p. at 1,800 r.p.m. Hydraulic power to the hoisting, derricking, and slewing, is provided by a Vickers vane-type pump driven by the engine through a flexible coupling. A system pressure from 1,550 lb. per sq. in. to 1,650 lb. per sq. in. is maintained with a rating of 12 to 14 h.p. at 1,500 r.p.m. A control circuit is fed through a relief valve to manually-operated directional valves mounted in a bank for speed control and movement selection. The valves are spring-loaded and retained in a central position. They are operated independently.

Double-acting cylinders are used, fed by Aeroquip flexible hoses. Hydraulic locks retain the pressure in the hoist and derrick cylinders in the event of a power failure. An overriding manual control is provided. A 5-in. bore x 60-in. stroke cylinder in the jib frame operates the hoist through a six-sheave pulley and lowering is power-controlled. The derricking cylinder is 4½ in. bore, x 35 in. stroke. The slewing cylinder is 4 in. bore x 30 in. stroke. It operates a rack meshing with a pinion at the base of the kingpost. Slewing is through 300 deg. and avoids passing the jib over the head of the operator.

The drive has a hydraulically-operated gearbox having six forward speeds and two reverse. Maximum speed is 15 m.p.h. with a creep speed of 2 m.p.h.

Further details can be obtained from Tunny Cranes Limited, Abbey House, Victoria Street, London, S.W.1.

NEW FIRE EXTINGUISHERS

The Plus range of pressure-charge-operated fire extinguishers contains chlorobromomethane or carbon tetrachloride with carbon dioxide added and is of greater fire-fighting efficiency than the present range. The new models are approved by the Fire Officers' Committee. The range will supersede the manufacturer's present extinguishers but pressure-charges for the old type of extinguisher will continue to be manufactured for at least ten years.

Further details can be obtained from Nu-Swift Limited, Elland, Yorkshire.

DIFFERENTIAL TRANSFORMERS

As a result of the recent agreement between Electro Mechanisms Limited and the American firm of Schaevitz Engineering, a series of inexpensive linear-variable differential transformers is available in the United Kingdom, in addition to the range of instruments already available from the company. This includes rotary variable-differential transformers, transducers, recording and indicating equipment, and rotary accelerators or centrifuges.

Further details can be obtained from Electro Mechanisms Limited, 218-21, Bedford Avenue, Slough, Buckinghamshire.

Presentation of locomotive nameplate

The Arsenal Football Club are now the owners of one of the nameplates which were formerly carried on Class " B.17/4 " locomotive No. 61648 *Arsenal*.

This locomotive was broken up in 1958 and a very keen Arsenal supporter, Mr. G. J. Houldsworth of York, acquired the nameplates, one of which he intended to present to the Club on a suitable occasion. On hearing from the Traffic Manager, Kings Cross, that the Arsenal Club had enquired the whereabouts of the nameplates, Mr. Houldsworth, who is employed by British Railways at York, offered to make one available to the Club, and the illustration shows the display which has been arranged for it at Highbury.

The nameplate and gilt football are mounted above the enquiry and general office window, and a photograph of the locomotive alongside records some details. and the fact that this photograph was originally donated to the Club by the directors of the former London & North Eastern Railway.

Locomotive nameplate "Arsenal" in position over main box-office window

Victoria Line

The London Transport Executive has altered the plans for the alignment in the Walthamstow area of the proposed Victoria tube railway line to provide for it to terminate, not at Wood Street Station of the Eastern Region as originally intended but at Hoe Street Station, which is in the centre of Walthamstow, approximately ¾ mile on the London side of Wood Street. Interchange with the Eastern Region electrified services to Highams Park and Chingford would be provided at Hoe Street instead of at Wood Street as hitherto planned.

Prohibitive costs

The Eastern Region line through Walthamstow to Chingford has now been electrified on the high-voltage system and major alterations which would be required to the layout of track and to the overhead electrical equipment at Wood Street would be prohibitively costly if that station were to become the terminus of the Victoria Line. Serious disturbance would also be caused to Eastern Region services and passengers while the work was being carried out.

This revision will mean that the Walthamstow Station of the Victoria Line will be under the existing Hoe Street Station of the Eastern Region and not, as previously proposed, at the junction of High Street, Hoe Street, and Church Hill. Satisfactory interchange can be provided on the new site between the Victoria Line at low level and the Eastern Region services above, and through passengers between the Victoria Line and Highams Park and Chingford will not be put to any inconvenience by the operation of the revised arrangements.

The revision of plans will also have the effect of making a substantial reduction of the order of £1,400,000 in the capital cost of the Victoria Line.

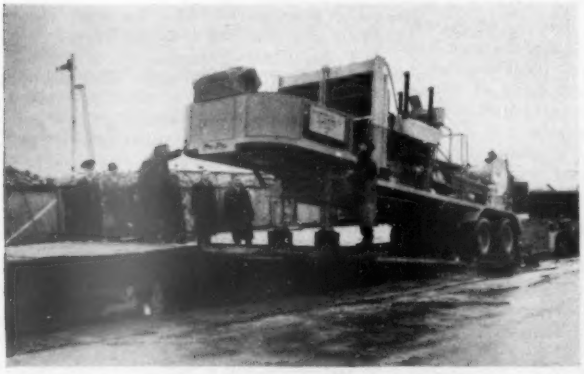
The Ministry of Transport, the Essex County Council and the Walthamstow Borough Council have been informed of the change in plans. This will remove the cause of delay which is holding up important building developments at Walthamstow. Parliamentary powers will be required to give effect to the new alignment of the diverted and revised underground route.

Transport of heavy loads

The Eastern Region of British Railways recently transported a 24-ton cementation trailer, *en route* for oilwell servicing operations in Italy. It was also responsible for delivered train loads of concrete beams for an important bridge-building operation.

The task of transporting the trailer from Haverhill, Suffolk, to the port of Harwich, presented many problems—particularly when it came to the loading and unloading operations. British Railways provided a special flat-bottom rail wagon to carry the trailer on the first stage of its journey to Milan. The apparatus was brought from the premises of a Haverhill company and moved, inch-by-inch, up the loading ramp on to the railway wagon.

Two train-loads of concrete beams, some 70 ft. long and weighing about 50 tons each, were carried from St. Ives to Watford recently. Both these tracks are shown below.



Cementation trailer (left), and concrete beams (right), being transported in the Eastern Region of British Railways

English Electric representatives in U.S.S.R.

Impressions gained by four-man delegation to Russian electric locomotive industry

On November 23 at the Ministry of Railways in Moscow there was a Press conference of representatives of the English Electric Co. Ltd., who were in the Soviet Union for the purpose of learning about the Soviet electric locomotive industry.

Opening the conference Mr. Pyotr Muratov, Deputy Minister of Soviet Railways, said that useful and fruitful contacts had been established recently between British and Soviet railway experts.

Mr. Stanley Potter, head of the British delegation expressed the thanks of himself and his colleagues for the welcome and hospitality extended. He referred to journeys to Tbilisi, Novocherkassk, Rostov, Riga, and Leningrad during which an appreciation had been gained of the problems facing the Soviet Ministry of Railways & Transport. Mr. Potter said: "We have seen a little of the great developments that are taking place in the U.S.S.R., and we would like to join in with them in some way in helping this development. We have seen that the Soviet people are capable in their factories of producing fine locomotives. As engineers we envy the railway people of Russia because of the tremendous possibilities of development they have.

"As trains become larger and move faster, we believe that one of the problems which will face the Soviet railways is to produce reliable locomotives of greater power. We believe that there is a possibility of mutual benefit in co-operation between the English Electric Company and the Soviet railways in this field. I know very well that because of expansion in the Soviet Union they must have a greatly increasing production of railway vehicles and locomotives."

Mr. H. B. Calverley, Traction Development Engineer, endorsed Mr. Potter's statements and expressed his admiration of the 3,000-V. motor coach equipment being manufactured at Riga works.

Mr. D. B. Corbyn, Deputy Manager (Rectifier Department,) said he had been impressed by the general construction of Russian rectifying equipment and had found that Russian problems of mercury arc technique were much the same as those of Britain and that the solutions were very similar. He understood that the maximum growth would occur in semi-conductor industry, and he hoped to be able to learn from Russian specialists a little more of that industry before he left.

Answering the question of a newspaper correspondent: "What was the impression of the British experts from the catenary system joining a.c. and d.c. traction at the Ozherelie-Paveleys railway span?" Mr. Corbyn said the delegation had been very much impressed by the joining of two sections at Ozherelie and particularly by the way in which the signalling system and the power system had been interlocked. It appeared that interlocking was so arranged that incoming locomotive always received the correct power up to the final stage.

The Deputy Minister observed that this system was not the newest one—busier yards incorporated a more developed system.

Asked what Soviet factories the delegation had visited, Mr. Calverley said:

"At Novocherkassk there is a very big output of locomotives. We saw some very good equipment welding manipulators, fully complete buggy frames so all rolling is done on a down-hand position, and at Riga coach factory we saw some very fine examples of jigging and automatic spot-welding, and at Tbilisi the equipment we saw was very modern too. . . . The outstanding characteristic that I've seen everywhere among your engineers is what I should call—realism! The Director of Novocherkassk factory said to me that they are interested in locomotives and machines that really work reliably. And that I think is very important. Transport is a public service and it must be reliable.

"The Soviet electric locomotives are quite advanced, quite modern in general. I think that the Soviet electric locomotive industry is keeping well abreast of general developments throughout the world."

Mr. S. C. Lyon, the Company's Chief Locomotive Designer was the fourth member of the delegation.

Electric depot at Rugby

Work has started on the erection of a District Electric Depot at Rugby for the maintenance of electric locomotives and electric multiple-unit trains. The depot is located to the north of Rugby station on a site occupying approximately 100,000 sq. ft.

The scheme includes the modernisation of the Chief Mechanical & Electrical Engineer's Repairing Shop at Rugby, bringing it into line with modern techniques. In addition there will be an office, workshop, and amenities block which will house the Electric Traction Engineer and his staff. There will also be a workshop and amenities for the staff who will be maintaining the overhead line and other electrical equipment on the lines between Rugeley, Coventry, Northampton and Roade. Also included in the scheme will be a control room which will service all the power supplies to the electrified tracks from Rugeley down the Trent Valley line to Rugby, to Coventry, and to Roade via the main line, and also via Northampton.

The contractor for the scheme is Edward Wood & Sons Ltd., Derby, and it is hoped the depot will be completed in 1963.

Two-way express freight train

From December 11 a new overnight express-freight train service will be added to the list of "assured arrival" services now operating to and from the North Eastern Region of British Railways.

The service links the West Riding and Glasgow in both directions and places in the North Eastern Region served by this facility include Bradford, Keighley, Leeds, and Shipley.

This express runs every night of the week except Sunday and gives assured next-morning delivery for all consignments in containers or full wagon loads. The service represents a further stage in British Railways' effort to win heavy traffic from the congested roads.

To ensure fast timings being maintained, the progress of the trains throughout their run is reported to railway control offices along the route, and the wagons carry distinctive labels to indicate their priority. Road collection and delivery arrangements at forwarding points and destinations have been specially planned to link up with the service; door-to-door deliveries in rail/road containers being a special feature.

Tanganyika independence celebrations

"Developing the Lifelines of Independence" was the theme of the East African Railways & Harbours display at the Tanganyika Independence Exhibition held at Dar es Salaam from December 9-12. The exhibit included a large-scale model of Dar es Salaam harbour; a model "30" class locomotive 6 ft. long; a model of the new passenger ship on Lake Victoria, the RMS *Victoria* and a model of an E.A.R. & H. road goods-carrying vehicle.

The new rail link between Ruvu on the Tanganyika Central Railway Line and Mnyusi on the Tanga line, due to be completed in 1962, was featured by means of photographs and a map. Also given prominence in the display were other recently completed projects such as the new lake port at Mwanza South, the branch line to serve the Kilombero Valley sugar industry from Kilosa to Mikumi and the laying of prefabricated railway track.

The catering for the State and Government reception was undertaken by the Tanganyika Catering Department of the East African Railways & Harbours.

Every railway station, port and road service station throughout Tanganyika was specially decorated for the occasion with the new Tanganyika national flag and bunting in the national colours. In addition, the new port/commercial offices overlooking the port area in Dar es Salaam were floodlit.

Ulster Transport Authority

On December 7, Mr. Andrews, Ulster Minister of Commerce, stated at Stormont that the Ulster Transport Authority had decided that, despite any modernisation scheme, the railways in Northern Ireland could not be operated other than at a loss. The Minister said that this conclusion had been arrived at on the advice of the Authority's technical officers and had been conveyed to the Government so that it could decide as to the financing of the railway services in the future. The Authority's officers had investigated the possible return on a further £3 million investment of capital in the railways.

It was against this background that the proposed independent inquiry into the railways would take place and the House asked to consider legislation to enable railway losses to be financed for an interim period.

Parliamentary Notes

Transport Bill in committee

The first meeting of the standing committee of the House of Commons on the Transport Bill on December 5 was mainly taken up by a debate on amendments by Mr. C. Mapp (Oldham East—Lab.) proposing the setting up of a fifth statutory board for British Road Services.

Mr. Mapp submitted that British Road Services were big enough and had been sufficiently successful to assume board status. The Government were trying to sort out the problems of the railways, and here was an opportunity to erect also, at one and the same time, a national freight road service which could be operated effectively.

Mr. T. Steele (Dumbartonshire West—Lab.) said that the main competition with the railways would be from the road haulage industry, and it seemed to him that they must have a united front for the State part of the road services.

Mr. Ernest Marples, Minister of Transport, said that the main point was that railways are a complete monopoly; and so is London Transport. The docks had a dock competing alongside. Inland waterways was something different. British Road Services " is a different kettle of fish." On organisational grounds he did not see that B.R.S. should not come under the Holding Company.

Mr. G. R. Strauss (Vauxhall—Lab.) said that the Opposition, when they reached it, would have to examine Clause 29 very carefully. Could much better co-ordination between B.R.S. and the railways be achieved if B.R.S. were taken from its present position as a subsidiary of the Holding Company and made a Board ?

Mr. Mapp's amendments were rejected by 22 to 12 votes.

Union representation on Railways Board

At the second meeting of Standing Committee on the Transport Bill on December 6, Mr. Ernest Popplewell (Newcastle-upon-Tyne West—Lab.) continued a debate on an amendment he moved to Clause 1 (Subsection 3) which requires the Minister to make a choice of members for the Railway Board from " the organisation of workers."

Mr. Popplewell's amendment required the words " trade union " inserted in front of " organisation," which was resisted by Mr. John Hay, Joint Parliamentary Secretary to the Ministry of Transport, on the ground that the Minister's field of choice in this respect would be restricted to the trade union organisation of workers.

After considerable discussion the committee rejected it by 21 votes to 15.

Mr. Popplewell said that it was of extreme importance that representatives who were appointed to the Railway Board should have a knowledge not only of commercial values but of human relationships as well. There had been a healthy growth of consultative machinery, which included a general acceptance by people at the top level of the need to consult people at all levels and to persuade the " man on the spot " to accept necessary decisions.

Mr. Charles Mapp (Oldham East—Lab.) said that not one of the Stedeford Committee was in any way connected with the great band of people whose hearts and souls were in the railway business. If the Minister thought he would be able to run the railways with a series of accountants, Mr. Mapp, as an ex-railwayman, could say some startling things to those sort of people. If he said to accountants that Blackpool was not a paying proposition, they would probably be surprised. Those who knew transport knew the reasons for it. One could not run the railways like 10 or 12 factories.

Ministry's assurance

Mr. Hay said that in his opinion the choice of candidates ought not to be restricted in this way and as much flexibility as possible should be kept.

Questions in Parliament

Kentish Town-Barking line

Mr. R. Sorensen (Leyton—Lab.) asked the Minister of Transport on December 6 what information he had received from the Central Transport Consultative Committee concerning the proposed closing of the Kentish Town-Barking railway line and the effect this would have on the travelling public.

Mr. Marples said, in a written answer, that the British Transport Commission were not considering any proposals for closing this line.

Dam across the channel

Mr. Edwin Wainwright (Dearne Valley—Lab.) asked the Minister of Transport if, in view of the possiblity of the United Kingdom entering the Common Market, he would set up a committee to examine the possibilities of erecting a dam across the channel which would serve both as a means of transport and as a source of electrical power.

Mr. Marples said, in a written answer, that there was no evidence which would justify setting up such a committee.

Staff & Labour Matters

Shorter working week

The Railway Staff National Tribunal, under the Chairmanship of Mr. Roy Wilson, Q.C., President of the Industrial Court, sat on December 6 to hear the claims of the three Railway Trade Unions in regard to the implementation of a shorter working week of 42 hours for railway conciliation staff, and 40 hours for railway salaried staff. The other members of the Tribunal were Sir Richard Sneddon and Mr. R. Willis.

The Associated Society of Locomotive Engineers & Firemen was seeking that the shorter working week of 42 hours for footplate grades should be introduced on the basis of 21 turns of 8 hours each four weeks, which would give an additional rest day in that period compared with the existing method of rostering the 44 hour week, *viz.*, 11 turns of 8 hours each fortnight.

The National Union of Railwaymen was similarly seeking, for those staff at present rostered on 11 turns of 8 hours each fortnight, which includes the bulk of shunters and signalmen, trainmen and certain station staff, the 42 hour week to be rostered on the basis of 21 turns of 8 hours each four weeks. In addition, all three Railway Trade Unions, including the Transport Salaried Staff Association, on behalf of salaried staff, were claiming that the reduced working week should be introduced with retrospective effect to October 30, 1961, which was the date when the 42-hour week was granted to railway workshop staff.

The British Transport Commission submitted that, to reduce the impact of the shorter working week and keep the cost within reasonable limits, there should be flexibility to introduce rosters for staff at present working an 11-turn fortnight so that, in addition to some turns on the basis of 21 turns of 8 hours each four weeks, there would in appropriate cases, be freedom to roster on the basis of 11 turns of 7 hr. 38 min., and, to a lesser degree, on 5 turns of 8 hours 24 minutes each week. So far as grades other than those on 11 turns each fortnight are concerned, a basis of agreement has been reached and the rostering arrangements were not in dispute before the Tribunal. The Commission was also opposed to any question of retrospective application over a period when there had been no opportunity to adjust rosters.

The decision of the Tribunal is awaited.

Southern Region work to rule suspended

At a meeting at New Cross on Sunday, December 10, most of the Southern Region electric train drivers who had been working to rule for a week in protest against the British Transport Commission's attitude on pay claims and shorter working hours decided to return to normal working as from midnight December 10, until January 1, 1962.

The men feel that by January 1 they will know the result of the claim in respect of a shorter working week which is awaiting the decision of the Railway Staff National Tribunal: also during the intervening period there will be opportunity for the unions and the Commission to discuss the men's pay claim.

The Deputy Chairman of the British Transport Commission issued the following statement on December 8, in connection with the " go slow " tactics:

" The Southern Region of British Railways regrets the serious inconvenience and delay to large numbers of their passengers as a result of the irresponsible action of a relatively few motormen in refusing to co-operate with the management.

" Their action is alleged to have been taken in protest against the attitude of the British Transport Commission to the national claims for a shorter working week and increased pay for railwaymen. These claims are being negotiated in accordance with an agreed procedure and nothing has happened during the course of the negotiations to justify a small group of men attempting to force the issue by taking matters into their own hands. Moreover, the men's action is not supported by the headquarters of their union—the Associated Society of Locomotive Engineers & Firemen.

"Public opinion of the railways is improving and the future of railwaymen depends on the continuance of this improvement. It is regretted that a few motormen should destroy the high regard which drivers generally have built up by their sense of public duty. It is of the greatest disservice to their case that they should take this arbitrary and unconstitutional action at this critical time.

"Every effort is being made both by the Union and by the Southern Region to secure a return to normal working at the earliest possible moment."

CONTRACTS AND TENDERS

Sudan deisels to be supplied by the English Electric Group

Sudan Railways has placed an order with W. G. Bagnall Limited for six 350 h.p. diesel-hydraulic shunting locomotives. W. G. Bagnall have recently joined the English-Electric Group of companies and the locomotives will be built at the Darlington works of Robert Stephenson and Hawthorns—also members of the Company's rail traction group. The locomotives will be powered by Rolls-Royce engines, and transmission is through a Rolls-Royce torque convertor and Wiseman reverse and final drive gearbox. The units will weigh 32 tons in working order.

Tempered Rubber Components Limited, a member of the Tempered group of companies, has recently completed the manufacture of a consignment of rubber-to-metal bonded fittings for rail coaches which are being built in India. The order comprised 1,200 rubber-to-metal bonded buffers, 2,400 rubber-to-metal bonded stops and 9,600 rubber-to-metal bonded axle-holding arm rubbers.

British Railways, North Eastern Region, has placed the following contracts:—

Concrete (Northern) Limited: supply and erection of a concrete floor and roof beams for the new telephone exchange building at Darlington Bank Top Station;

Brighouse Estates (Buildings) Limited: installation of drainage pipes and erection of catchpits on the Leeds-Doncaster line at Nostell;

Cawood Wharton & Co. Ltd.: construction of 40 brick pits for lamp columns and installation of asbestos cement pipes at Bridlington Passenger Station.

The Export Services Branch, Board of Trade, has received calls for tenders as follow:—

From Australia :

12 diesel-electric locomotives, general purpose, 900-1,000 h.p.

The issuing authority is the South Australian Railways Commissioner, Adelaide, to whom bids should be sent. The closing date is February 1, 1962. The Board of Trade reference is E.S.B./36643/61.

From Egypt :

Supply of bars round spring steel.

The tender No. is E.R.307.G.8/239. The closing date is December 30, 1961. The Board of Trade reference is E.S.B./36663/61.

Supply of galvanised steel wire.

The tender No. is E.R.305.G.8/239. The closing date is December 30, 1961. The Board of Trade reference is E.S.B./36662/61. The issuing authority is the Purchases & Stores Department, Railways Building, fifth floor over Shoubra Subway, Cairo, to which bids should be sent.

From Greece :

20 pieces of boiler firebox tube plates to S.E.K. drawing No. 12064.

The tender No. is 5314. The closing date is December 29, 1961. The Board of Trade reference is E.S.B./36661/61.

100 metric tons of creosote oil

The tender No. is 5313. The closing date is December 29, 1961. The Board of Trade reference is E.S.B./36957/61.

1 terminal telegraph unit of 12 channels
1 terminal telephone carrier of 5 units
13 terminal telephone units
1 power supply unit
1 power control unit
2 terminal telegraph units of 6 channels
2 electronic voltmeters
1 cathode-ray oscillograph.

The tender No. is 5318. The closing date is December 22, 1961. The Board of Trade reference is E.S.B./36660/61. The issuing authority is the Purchasing & Stores Department, Hellenic State Railways (S.E.K.), 34 Themistocleous Street, Athens, to which bids should be sent.

From India :

Supply of equipment and technical details in connection with the provision of automatic signalling between Mugma and Pradhaukanta.

The issuing authority is the General Manager, Eastern Railway, Calcutta, to whom bids should be sent. The tender No. is ER/auto-signalling/v. The closing date is April 9, 1962. The Board of Trade reference is E.S.B./34651/61.

From Iraq:

400,000 standard-gauge wooden sleepers.

The issuing authority is the Iraqui Republican Railways. Bids should be sent to the Secretary, Tenders Opening Committee, Ministry of Communications, Baghdad. The tender No. is 15. The closing date is December 24, 1961. The Board of Trade reference is E.S.B./36318/61.

From Pakistan :

1 diesel engine-driven generating set of 50 kW. capacity

2 diesel engine-driven generating sets of 30 kW. capacity, complete with accessories and switchgear

The tender No. is P8/HA/58/61. The closing date is January 4, 1962. The Board of Trade reference is E.S.B./37247/61.

3 diesel engine-driven generating sets of 100 kW. capacity, complete with accessories and switchgear.

The tender No. is P8/HA/83/61. The closing date is January 8, 1962. The Board of Trade reference is E.S.B./37249/61.

18 electric motor-driven air-cooled refrigeration compressors with suitable condensers, complete with accessories.

The tender No. is P8/HA/60/61. The closing date is January 6, 1962. The Board of Trade reference is E.S.B./37248/61. The issuing authority for the above tenders is the Chief Controller of Stores, Pakistan Eastern Railway, Pahadtali, Chittagong, to whom bids should be sent.

From South Africa:

10-15 pneumatic-tyre bulk-fuel tank trailers which can be hauled behind heavy motor vehicles and can also be transported by rail in standard S.A.R. trucks of the ES and DZ types, excluding tyres, and tubes but including the cost of fitting thereof, in accordance with Specification.

10-50 device for securing trailer in the truck in accordance with clause No. 14 of Specification.

The tender No. is F.8912. The closing date is January 12, 1962. The Board of Trade reference is E.S.B./36926/61.

12 portable semi-automatic inert-gas metal-arc welding machines, suitable for the general welding of mild-steel plates, steel and steel castings, complete, as called for in the mechanical specification No. 5780 and electrical specification PLP.WIF.2/61.

The tender No. is G8914. The closing date is December 22, 1961. The Board of Trade reference is E.S.B./36995/61.

1 lot traction sub-station equipment for 3,000 V. d.c. electrification, including h.t. lighting arresters, circuit breakers, transformation, etc.

The tender No. is C.8927. The closing date is March 2, 1962. The Board of Trade reference is E.S.B./36928/61. The issuing authority for the above tenders is the Stores Department, South African Railways. Bids should be sent to the Chairman of the Tender Board, South African Railways, P.O. Box 7784, Johannesburg.

From Sudan :

Supply of 80 metric tons of lubricating oil for Gardner diesel engines.

The tender No. is 2426. The closing date is January 8, 1962. The Board of Trade reference is E.S.B./36922/61.

1,700 ft. h.t. copper cable 3 x 0·03 (19/0·044) sq. in. underground.

1,700 ft. wire netting galvanised, 2-ply selvedges 1§ in. hexagonal s.w.g. 16 width 30 cm.

1 3-panel h.t. metal-enclosed truck-type switchgear for 11,000 V. 3-phase, 50 cycles per sec., 250 kW.

5 junction boxes for 11,000 V.

3,000 ft. l.t. underground copper cable.

The tender No. is 2511. The closing date is January 3, 1962. The Board of Trade reference is E.S.B./36921/61. The issuing authority is the Office of the Controller of Stores, Sudan Railways, Atbara (P.O. Box No. 65) Sudan, to which bids should be sent.

Further details relating to the above tenders together with photo-copies of tender documents, unless otherwise stated, can be obtained from the Branch (Lacon House, Theobald's Road, W.C.1).

NOTES AND NEWS

Proposed canal closures. The British Transport Commission is seeking Parliamentary powers to close 13 stretches of waterway to navigation.

Kent coast services next summer. The Southern Region of British Railways is to introduce faster and more frequent services on the Kent coast lines on June 18, 1962.

George Cohen tools department. The Engineer's Tools Department of George Cohen, Sons and Co. Ltd., has moved to 23-25, Sunbeam Road, London, N.W.10, telephone number Elgar 7222.

N.E.R. Christmas train service. During the Christmas holiday period the North Eastern Region of British Railways is to run 115 relief trains, on 35 of which restaurant-car facilities will be provided. There will be alterations to normal services and a reduced service will operate on Christmas Day.

Southern Region Christmas trains. Over the Christmas period the Southern Region of British Railways is to run 170 extra main-line trains to the South Coast and the West of England. The Region is to drastically curtail its service on Christmas Day.

New road for Hemel Hempstead. The Minister of Transport has made a grant of £40,808 to Hertfordshire County Council towards the cost of constructing a road in Hemel Hempstead New Town, estimated at £114,013. Hemel Hempstead Development Corporation is contributing £46,046.

E.R. Christmas trains. The Eastern Region of British Railways is to run 303 additional main-line trains over the Christmas and New Year period this year. Normal services will operate on December 22, 23, and 24. A very limited service will operate on Christmas Day and a Sunday service on Boxing Day.

Minister's visit to Vickers. Lord Hailsham, Minister of Science, visited the Research Establishment, near Ascot, of the Vickers Group of Companies on December 4.

"Five-daily-return" tickets. The North Eastern Region of British Railways has introduced a "Five-daily-return" ticket from York to Harrogate. This is available for one return journey each day from Monday to Friday and will cost less than a weekly season ticket.

Permanent way depot at Doncaster. The Eastern Region of British Railways has completed the building of a permanent way depot just south of Doncaster Station, to concentrate the maintenance and renewal of track in the area.

N.E.R. to convey "out-of-gauge" load. The first special-train load of box girders which Head Wrightson Teesdale Limited, Thornaby, are manufacturing for the approach spans of the Forth Road Bridge left the company's sidings on December 8. The train conveyed eight girders measuring 9 ft. wide x 7 ft. deep and up to 51 ft. 3 in. in length on Borail wagons. The largest girder weighed approximately 18½ tons.

Special train for Smithfield Show. The Scottish Region of British Railways ran a special livestock train from Edinburgh Waverley Station, on December 1, to transport cattle and their attendants to the Smithfield Show at Earls Court, London.

L.M.R. passenger service withdrawal. The London Midland Region of British Railways is to withdraw the passenger train service between Rugby (Midland) and Leicester (London Road) from January 1, 1962. The line between Rugby Wharf and Wigston South will be closed completely from the same date.

Frocester Station closed. Frocester Station, in Gloucestershire, in the Western Region of British Railways, was closed on December 11.

Scottish Region Christmas trees. Illuminated Christmas trees will be displayed at stations in Glasgow, Edinburgh, Dundee and Aberdeen by the Scottish Region of British Railways.

A.E.I. Coventry district office. Associated Electrical Industries Limited has opened a district office at Coventry. The address is Alma Street, Coventry, and the telephone number Coventry 24181.

Success of Midland Pullman. The London Midland Region of British Railways has announced that the Midland Pullman is attracting an average loading of 95 per cent capacity and has a record of 95 per cent punctuality.

More services to use diesel power. Main-line diesel locomotives have replaced steam on the Manchester-Glasgow service of the London Midland Region of British Railways. From January 1, diesel multiple-unit trains will replace steam trains on the Region's Manchester- Rochdale-Todmorden-Sowerby Bridge route to Leeds, Halifax, Bradford, and Wakefield.

Second stage of road construction. The second stage of the "Heads of the valleys" road being constructed to supersede the existing Neath-Abergavenny trunk road, the A465, is to start shortly. The contract, worth over £3 million, has been let to Lehan, Mackenzie & Shand Limited, in association with Christiani & Nielson Limited.

Train fire at Worthing. A fire in a passenger coach at Worthing Central Station on the Southern Region of British Railways, caused ½ hr. delay to the Brighton-Littlehampton service on December 8.

Diesel trains withdrawn. Minor axle faults have caused the withdrawal of 17 of the 34 diesel trains operating the daily run between Nottingham, Leicester, and Birmingham on the London Midland Region of British Railways. Withdrawal is a precautionary measure and services are being maintained by steam trains until modifications are made.

Underground flood. The Bank to Waterloo Underground line of the London Transport Executive was flooded on December 8. A water main burst in Walbrook, in the City, flooded the tunnel and stopped the travolator.

Containers to Ireland ban lifted. The five-year old dispute between Dublin dockers and the shipping companies ended on December 13. The London Midland Region of British Railways has four container ships which were built specially for the carriage of container traffic.

Accident at Paddock Wood. The main line from Dover to London and all lines at Paddock Wood, on the Southern Region of British Railways, were blocked when two goods trains were in collision. The trains concerned were the 1.15 a.m. from Ashford and the 12.20 a.m. from Hoo to Tonbridge.

N.U.R. strike call. The South Wales & Monmouthshire district council of the National Union of Railwaymen has asked the National Executive of the Union, on December 10, to hold a 24-hr. national token strike in protest against branch-line closures.

Unofficial strike in Ireland. The 140 footplate staff in Cork and Tralee who have been on unofficial strike for the past four weeks, over the suspension of an engine driver for allegedly failing to carry out a foreman's order, have returned to work.

Increase in meat haulage rates. Hauliers who carry meat will increase their rates by 10 per cent from January 1, 1962, in accordance with the recent recommendation of the National Committee of the meat carriers group of the Road Haulage Association.

N.E.R. badminton competition. The Second Annual Badminton Competition organised by the British Railways' Staff Association, North Eastern Region, was held in the Railway Institute Gymnasium, Queen Street, York, on December 9. Mrs. F. C. Margetts, wife of the General Manager of the North Eastern Region, presented the prizes.

Diesel deodorant tested. Tests have been carried out at the Department of Scientific & Industrial Research at Stevenage, Hertfordshire, to determine the effect of REDeX D.D. on the constituents of exhaust gas from a diesel engine. The purpose of these tests was to see if there was any significant difference in the composition of the exhaust gas when the additive was present in the fuel. The tests showed that the use of REDeX D.D. does not affect adversely the composition of exhaust gas. There was a consistent reduction in aldehyde concentration, and it was apparent that the aldehydes had an unpleasant smell and caused irritation of the nose and eyes. Attention was also drawn to the readings obtained for C.O. content.

Christmas services on the Western Region. The Western Region of British Railways will run 173 special long-distance trains during the Christmas period this year to augment advertised weekday services on December 22,

Steel foundry section of Brown, Lenox & Co. Ltd., showing pattern and core boxes, mould and finished casting

23, 26 and 27. Services on December 24 and 25 will be considerably curtailed.

Steel foundry symposium. Brown, Lenox & Co. Ltd. held a symposium at the May Fair Hotel, London, on November 28, to make known improved methods of manufacture adopted by the company. The illustration above shows the steel casting section of the symposium.

Additional Metropolitan Line trains. The London Transport Executive is running two additional Metropolitan Line trains to Amersham in the evening on Mondays to Fridays. The 7.36 p.m. train from Baker Street terminating at Rickmansworth at 8.15 p.m. has been extended to Amersham, to arrive there at 8.30 p.m. An additional fast train runs from Baker Street at 8.7 p.m. calling at Finchley Road, Harrow-on-the-Hill, Moor Park and then all stations to Amersham, where it will arrive at 8.54 p.m. As a result of these alterations, there are additional trains from Amersham at 8.47 p.m. to Rickmansworth and 9.18 p.m. to Harrow-on-the-Hill. The shuttle service on the Chesham branch of the Metropolitan Line has also been improved during the afternoon on Mondays to Fridays. Additional trains run from Chesham at 1.26, 2.56 and 3.56 p.m., returning from Chalfont and Latimer at 1.45, 3.15 and 4.15 p.m.

Railway Stock Market

Foreign rails have been quite well maintained, but quotations were scarcely tested by dealings. Antofagasta ordinary and preference stocks have kept at 16¼ and 35 respectively at the time of writing, and the 4 per cent perpetual debentures were 48½. Costa Rica ordinary stock was 36, and Chilean Northern 5 per cent debentures 48½. Paraguay Central prior debentures were less active but maintained their recent rise to 23, while elsewhere, Mexican Central "A" bearer debentures were 56½ and San Paulo Railway 3s. units 1s. 9¾d. In other directions, International of Central America common shares remained at $13½, but the preferred stock receded from $84 to $80. Brazil Railway bonds were 2⅜, and Guayaquil & Quito assented bonds 55.

Canadian Pacifics strengthened from $43⅜ to $43⅝, but the preference stock came back from 56½ to 54¼ and the 4 per cent debentures from 52⅜ to 51⅛. White Pass shares were quite well maintained at $12¾. Nyasaland Railways shares were 11s. and the 3½ per cent debentures 35.

West of India Portuguese capital stock kept at 139½, Barsi Light Railway stock at 17, and Shahdara (Delhi)—Sharanpur Light Railway 4½ per cent debentures have changed hands at 30. Emu Bay 5 per cent irredeemable debentures were 39½ and Midland of Western Australia ordinary stock 11.

Among shares of locomotive building and engineering companies, G. D. Peters shares were firmly held and quoted at 16s. 10½d. Gloucester Wagon 10s. shares have come back at the time of writing to 11s. 9d. awaiting any further developments in the take-over moves. Wagon Repairs 5s. shares were steady at 26s. 3d., Beyer Peacock 5s. shares 6s. 9d., and Charles Roberts 5s. shares 4s. 4½d. Birmingham Wagon shares were easier at 21s. and North British Locomotive 5s. 6d. Westinghouse Brake eased further from 23s. 9d. to 23s. 3d.

In electricals, A.E.I. after falling to 28s. 3d., the lowest point for the year, rallied to 29s. 9d., while English Electric at 24s. were a little better on balance, and also G.E.C. at 24s. 3d. B.I.C.C. were 56s. 7½d. and Crompton Parkinson 5s. shares strengthened to 13s. Mather & Platt were 36s. 3d. at which the yield is 6 per cent on the basis of last year's 11 per cent dividend. Pollard Bearing 4s. shares after receding to 30s. firmed up to 30s. 9d., Ransome & Marles 5s. shares were 15s. 3d. Pressed Steel 5s. shares have changed hands around 17s. 6d. at the time of writing, and Dowty Group 10s. shares were firmer at 29s. 4½d. Broom & Wade 5s. shares kept at 21s. 9d. Leyland Motors were 85s. at which the yield is little more than 4½ per cent, which reflects the confident view in the market that the 20 per cent dividend is likely to be maintained. Steel shares were active, and after further falls have been inclined to rally on the financial results which show a sharp fall in profits.

Forthcoming Meetings

Dec. 16 (*Sat.*). Norbury Transport & Model Railway Club, St. Stephen's Church Hall, Thornton Heath, from 11 a.m. Transport & Travel Exhibition.

Dec. 18 (*Mon.*). Institute of Transport, 80 Portland Place, W.1, at 5.45 p.m. Annual general meeting of corporate members.

Dec. 19 (*Tue.*). Railway Enthusiasts' Club, Brunswick Club, 30, Wandsworth Road, S.W.8, at 7.30 p.m. "The railways of New Zealand," by Mr. J. B. Snell.

Dec. 21 (*Thu.*). Institution of Locomotive Engineers, at 1, Birdcage Walk, S.W.1, at 5.30 p.m. "The engineering aspect of catering on trains," by Mr. H. Wilcock, Mr. W. E. Bulman, and Mr. H. Simons.

Jan. 4 (*Thu.*). British Railways, Western Region, Lecture & Debating Society, Headquarters Staff Dining Club, Paddington, at 5.45 p.m. "Traffic costing today—a critical appraisal," by Mr. G. Dickinson.

Jan. 5 (*Fri.*). The Railway Club, Royal Scottish Corporation, Fetter Lane, E.C.4. Display of 16-mm. railway films.

Jan. 10 (*Wed.*). Railway Students' Association, London School of Economics & Political Science, Houghton Street, W.C.2, at 6.15 p.m. "Forward into the European Railway Community," by Mr. J. L. Harrington.

Jan. 11 (*Thu.*). London Midland Region Lecture & Debating Society, Friends Meeting House, Euston at 5.45 p.m. "Films in the service of transport," by Mr. E. Anstey.

Jan. 11 (*Thu.*). British Railways, London Midland Region, Lecture & Debating Society, at Preston. "The postal service of the country and its relationship to British Railways," by the Head Postmaster, Preston.

Jan. 17 (*Wed.*). Railway Enthusiasts' Club, Brunswick Club, 30, Wandsworth Road, S.W.8. at 7.30 p.m. Film show on railway electrification.

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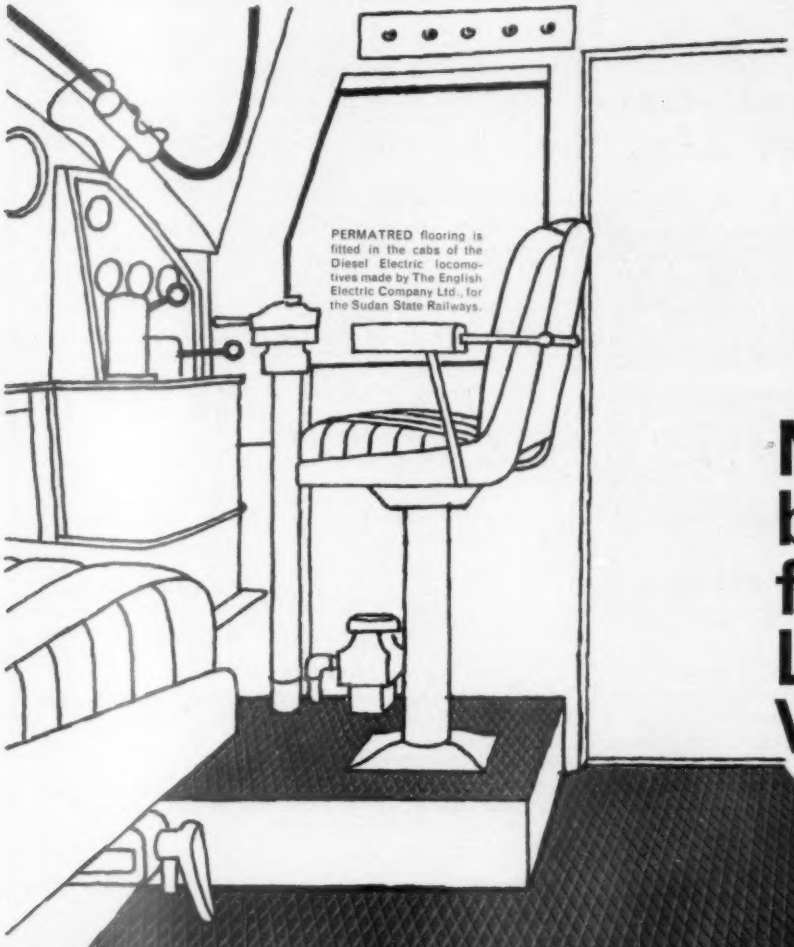

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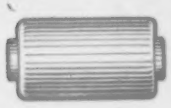

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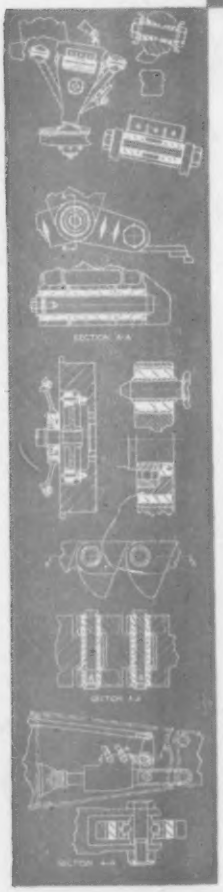

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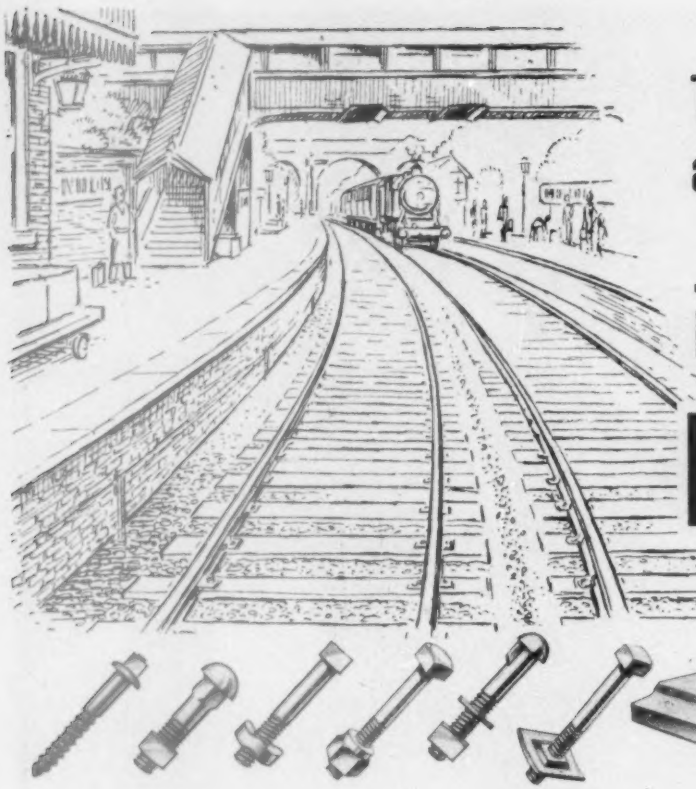

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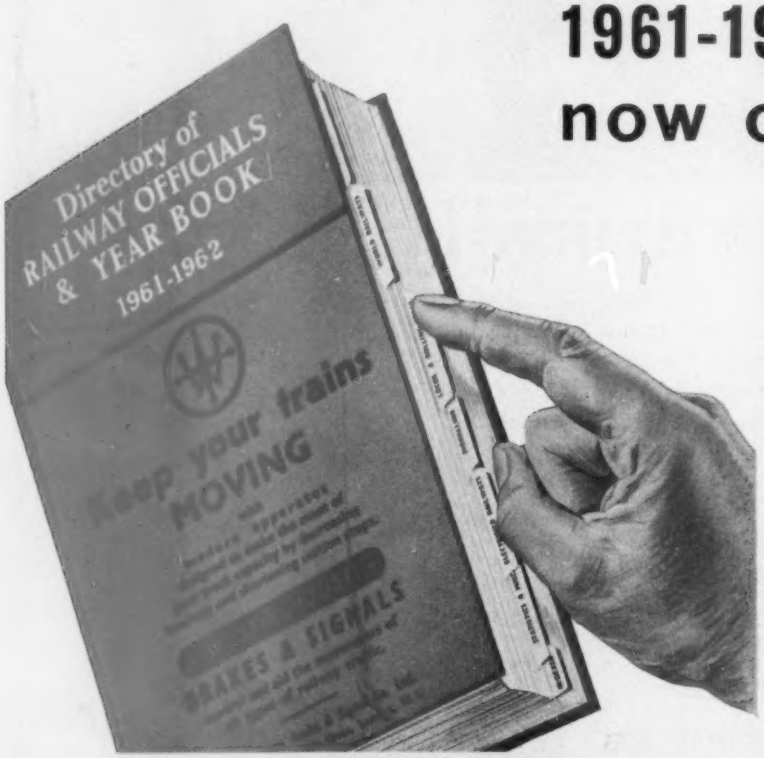

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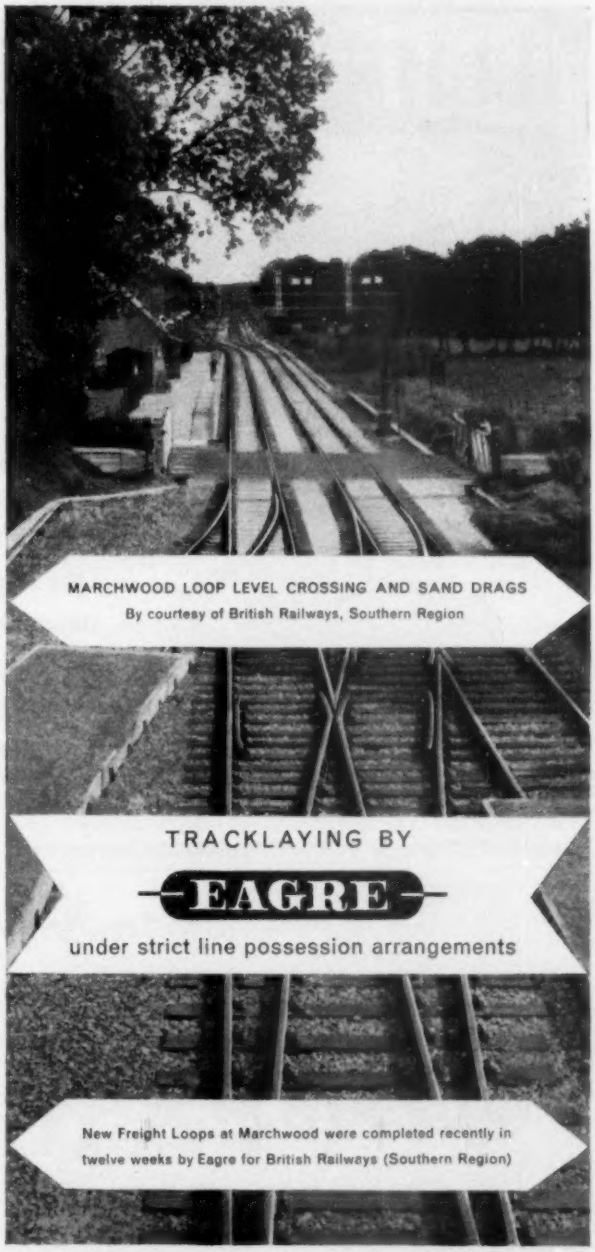

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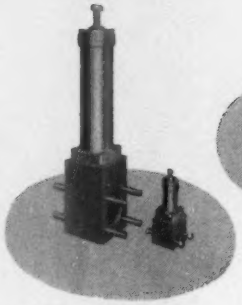

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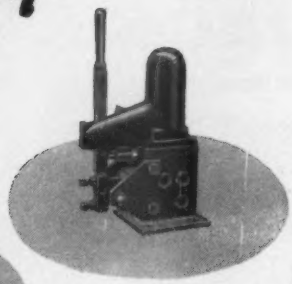

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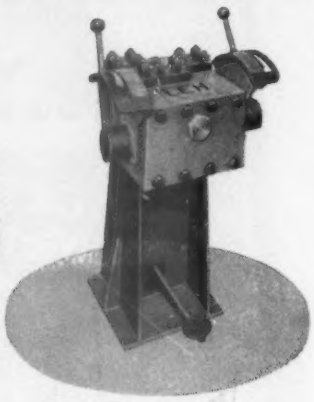

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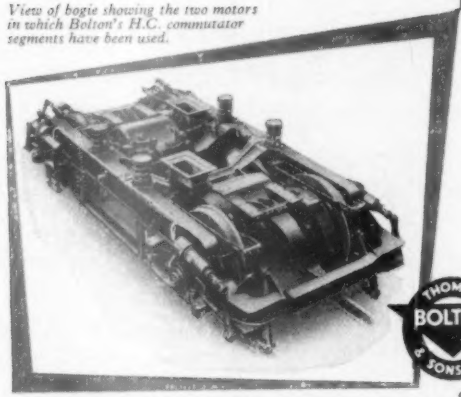

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Steel, Peech & Tozer ... —
Steels Engineering Products, Ltd. ... ... —
Stirk, John, & Sons, Ltd. ... —
Stone, J., & Co. (Deptford), Ltd. ... ... —
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Swiss Car & Elevator Manufacturing Corp. ... ... —
Swiss Industrial Company... —
Swiss Locomotive & Machine Works ... ... —
Sylglas Company, The ... —

Talbot Waggonfabrik ... —
Tangyes, Ltd. 9
Tarmac Roadstone Ltd. —
Taylor Bros. & Co., Ltd. ... 15
Taylor Bros. (Sandiacre), Ltd. ... ... —
Taylor, F., & Sons (Manchester), Ltd. ... ... —
Tearne & Sons, Ltd. ... —
Tees Side Bridge & Engineering Works, Ltd. ... —
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Tempered Rubber Components, Ltd. 22
Tempered Spring, Co., Ltd. —
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Vacuum Brake Co., Ltd. ... —
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Vokes, Ltd.... ... ... —
Vulcanised Fibre, Ltd. ... —

Walker, James, & Co., Ltd. —
Ward, H. W., & Co., Ltd. —
Ward, Thos. W., Ltd. ... —
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Westinghouse Brake & Signal Co., Ltd. ... 4
White, R., & Sons (Engineers), Ltd. ... ... —
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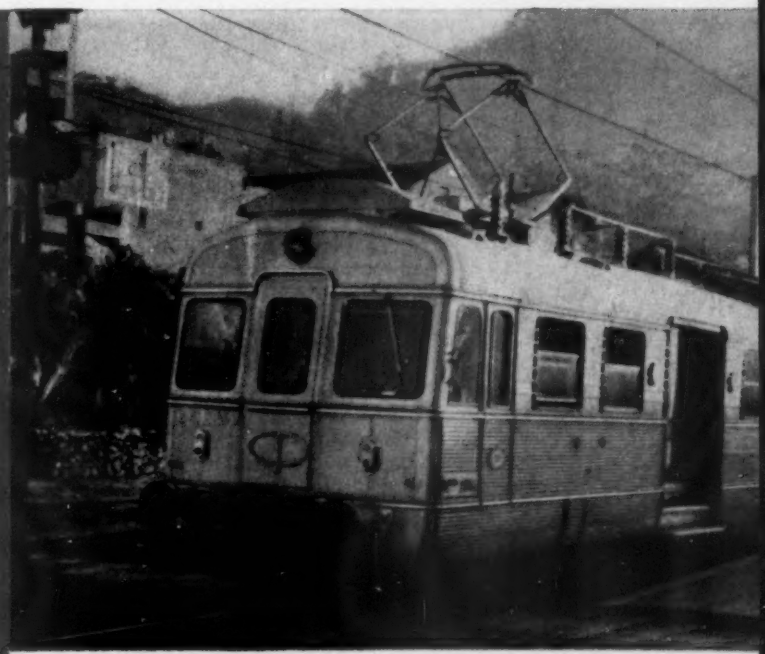

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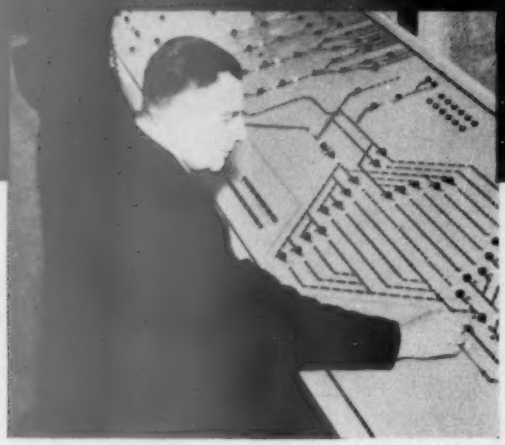

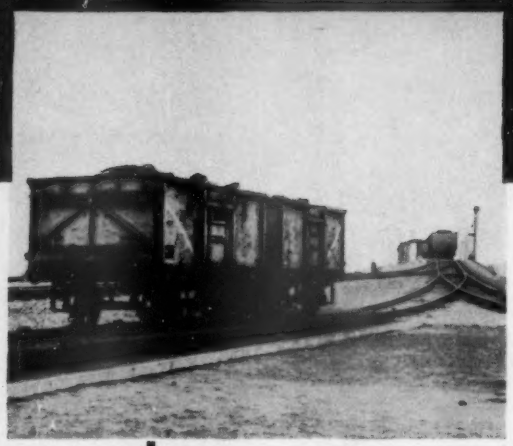

AEI-GRS Equipment at Margam, British Railways, Western Region. (*Left*) Desk in control tower at Margam showing marshalling yard controls at left and Type NX Route Relay Interlocking controls (nearest camera). (*Right*) A 'cut' in a primary retarder. (Photographs by courtesy of British Railways)

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